BEFORE THE
CALIFORNIA ENERGY COMMISSION

In the matter of 2011 Rulemaking on Appliance Efficiency Regulations	) Docket No. 09-AAER-2)
California Code of Regulations, Title 20, Section 1601 through Section 1608	))

Appliance and Process Energy Office
Staff Workshop

Battery Chargers and Lighting Controls

CALIFORNIA ENERGY COMMISSION
HEARING ROOM A
1516 NINTH STREET
SACRAMENTO, CALIFORNIA

THURSDAY, MARCH 3, 2011
10:00 A.M.

Reported by:
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Present: (* Via WebEx)

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Dave Denkenberger*, Ecos Consulting
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Alan Mears, Motorola Solutions, Inc.
Kevin Messner, AHAM, Association Home Appliance
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Ayat Osman*, CPUC
Jeff Price
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Harinder Singh
Phillip Walters, Ecos
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Presenters

Mike Leaon, CEC
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Gary Flamm, CEC
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Suzanne Foster-Porter, Ecos Consulting
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P R O C E E D I N G S

MARCH 3, 2011 10:10 A.M.

MR. LEAON: Okay, good morning everyone. Welcome to the staff workshop on Battery Chargers and Lighting Controls. I think everybody is about settled, so I think we should go ahead and – let me start over for the benefit of those that were on the phone that I had muted. Welcome to the Staff Workshop for Battery Chargers and Lighting Controls.

I have a few housekeeping announcements I'd like to make. First, in case of an emergency, the alarm will sound and we'll evacuate the building through the main entrance on Ninth Street. You can follow Energy Commission staff out, we'll evacuate to Roosevelt Park, which is across the street from Ninth and P., and so it's kind of kitty-corner on the southeast side from us. Restrooms are located directly across the atrium from Hearing Room A here. There is a snack bar on the second floor if you go up the main stairs to the second floor, it's under the white awning and, also, we do have a Court Reporter here today, so if you do want to make some comments, I'd ask that you provide a business card to the Court Reporter and also make sure you introduce yourself with name and organization. And before you get up to speak, if you could provide a blue card, fill out a blue card, and provide that to either CEC staff in the room – if

you can raise your hand – or bring it directly to me and I'll call on speakers to come up and speak.

We may have later in the workshop today -- Commissioner Karen Douglas might be attending later, as well as her Advisor, and Karen is the new Presiding Member over the Efficiency Committee; this proceeding is being run through the Efficiency Committee. At the moment, we don't have a second Commissioner on that particular committee and we are hoping that Commissioner Anthony Eggert will be reappointed, he was a previous Presiding Member for the Efficiency Committee and I would, well, this is my speculation, but I believe if her were reappointed, he would be back on the Efficiency Committee.

Okay, let me begin by quickly going over the agenda for today. We'll have a couple of background presentations, one from myself and one from the CPUC, and she'll be speaking over the phone, Ayat Osman. Later, we'll hear from Gary Flamm and he'll be addressing moving Title 24 lighting controls into Title 20 and the reasons behind that move. We'll follow that up with a staff presentation from Ken Rider. The staff report will be the subject of Ken's presentation. We'll have a lunch break following that and, when we come back from lunch, we'll have a presentation from Suzanne Foster-Porter with Ecos Consulting, and she'll be making that presentation on behalf of the IOUs, and she'll

be getting into some of the technical analysis that was done in support of this proceeding. Then, we'll have some time for open discussion and we hope to have you out of here by no later than 3:00. So, that is our agenda for today.

So, I had to pull out my presentation, for the folks who are on the phone. I would like to begin with some background and history, I need to adjust the slides here, bear with me. All right, so let's get started. This is a little background and history that I'll be covering in my presentation this morning, and I'd like to begin with a little preamble: The California Energy Commission is the State's primary energy policy and planning agency. One of its primary responsibilities is promoting energy efficiency by setting statewide Appliance and Building Efficiency Standards. The Appliance Program ensures that regulated appliances sold or offered for sale in the state meet efficiency standards through outreach, education, certification, and enforcement.

Since the Energy Efficiency Appliance Regulations first went into effect in 1978, Appliance Standards have played an important role in reducing demand for electricity in California. Energy Commission staff estimate that, by 2010, Appliance Efficiency Standards have reduced electrical demand by over 18,000 gigawatt hours. This represents 6.7 percent of California's electric load in 2010, approximately

the amount of energy produced by two of California's largest power plants. At full compliance, the proposed Battery Charger Standards would add another 2,000 gigawatt hours per year. To adopt these standards, the Energy Commission must first determine that the standards are both cost-effective and feasible. Based on this analysis of the best available data, staff has found that the Battery Charger Standards, as proposed, do meet these requirements. Later today, I will be discussing in detail how staff reached those conclusions, as well as discussing the efficacy of moving Title 24 to Title 20.

In regard to our enabling authority, under the Warren-Alquist Act, the Energy Commission is responsible for ensuring that a reliable supply of electricity in California, and for addressing concerns over growing electrical energy consumption through the use of wasteful and inefficient appliances, the Act establishes the authority for the Energy Commission to set Appliance Efficiency Standards, or maximum usage levels, to reduce the demand for electricity from appliances and to collect data on and verify the compliance of regulated appliances. Efficiency standards adopted under this authority must target devices that represent significant statewide energy use and be cost-effective and feasible.

In regard to some of our driving policy here at the

Energy Commission, in addition to the Warren-Alquist Act, the Energy Commission's biennial Integrated Energy Policy Report, or IEPR, also shapes California's policy approach to energy efficiency and standards. Since 2008, California's energy policy has defined a loading order of resource additions to meet the state's growing electricity needs, first, energy efficiency and demand response; second, renewable energy and distributed generation; and third, clean fossil fuel sources and infrastructure improvements. This loading order reflects the fact that the cheapest way to meet energy demand is through efficiency. Appliance Efficiency Standards is a key strategy for reducing overall electrical demand. Key benefits of the strategy include: reduced need for new power plants and transmission systems and increases in electrical system reliability. Similarly, reducing demand will help to achieve renewable energy goals by reducing the need for new renewable energy generation. California's energy agencies are working toward achieving 33 percent Renewable Energy by 2020. This translates into about 100,000 gigawatt hours. Reducing the amount of renewable generation needed to meet that goal will only make attaining that goal more feasible. And, finally, the IEPR has established clear policy direction for staff to adopt all cost-effective efficiency standards.

Some other policy drivers. In regard to climate

change, the Global Warming Solutions Act, AB 32, established the goal of reducing greenhouse gas emissions to 1990 levels by 2020. Reducing demand for electricity will be key for meeting those GHG reduction goals. This was reflecting the ARB's – the Air Resources Boards' – Climate Change Scoping Plan, which identifies efficiency standards as a key measure for reducing GHG's; specifically, it calls for reducing demand by 32,000 gigawatt hours. Again, Appliance Efficiency Standards must play a key role if that goal is to be met.

Another important policy document related to energy efficiency is the Energy Action Plan. The CPUC and CEC coordinate implementation of this plan. The key part of the plan is to reach zero net energy residential and commercial buildings by 2020 and 2030, respectively. The plan recognizes that addressing the growing plug load in California is necessary for attaining these goals. So, these are some of the important policy drivers that Appliance Efficiency Standards are going to play a key role in if we're going to meet those goals.

In regard to the history of the Battery Charger Standards development, the Energy Commission recognized back in 2003 that external power supplies and battery chargers represented a significant statewide load, and that significant energy savings could be achieved through

development of an efficiency standard for these types of devices. Consequently, the Commission opened a rulemaking in 2004 for external power supplies, but determined that a new test procedure was needed for battery chargers before starting a proceeding for that device.

In 2005, efforts got underway to develop a test procedure for battery chargers. A draft test procedure was released in 2007, and the Energy Commission subsequently adopted the test procedure in 2008. Ecos Consulting, on behalf of the IOUs, and that's Investor-Owned Utilities, began testing devices with new test methods to generate data, to help decide what levels a battery charger efficiency standard should be set at. The Energy Commission also asked industry to submit test data for consideration in the development of the case report that Ecos was developing. At that time, however, neither Ecos nor Energy Commission staff received industry test data. Ecos subsequently released the case report in 2009 based on the test results that it had conducted, "Proposing Efficiency Standard for Battery Chargers."

In regard to the process that we're engaged in now, we are currently in the pre-rulemaking phase of adopting Proposed Efficiency Standards for Battery Chargers. After reviewing the Battery Charger case report prepared by Ecos, in August 2010, Energy Commission staff sought direction

from the Efficiency Committee in regard to whether staff should begin a proceeding for adopting efficiency standards for battery chargers. The Committee directed staff to start the pre-rulemaking phase of the proceeding and to solicit stakeholder feedback regarding the proposed standard in the case report. Staff held a workshop in October 2010 to take comments on the case report and ask for written comments by early November. At that time, staff asked for alternative input assumptions that stakeholders thought better represented some key input assumptions in the case report. Staff did receive a significant amount of questions regarding the data used by Ecos, but no alternative input assumptions were provided. Staff reviewed the written comments and conducted a thorough review of both the source material for the Ecos study and the data being considered under a DOE proceeding for battery chargers, and determined that the data in the case report was based on reasonable assumptions and represented the best available data to the Energy Commission. Based on that conclusion, in January 2010, staff developed a spreadsheet model to generate an input to output analysis, based on the standard proposed in the case report. Running these input assumptions through the model showed that the proposed standard was both feasible, cost-effective, and saved energy. In early February, staff sent a letter to stakeholders, again

requesting alternative input assumptions for such inputs as duty cycles and incremental costs. We wanted to run these numbers through the model to see if different assumptions would change the results. Staff has not received any alternative data at this time, but will consider such data in preparing the final staff report, and there still is time to submit that data. The draft staff report and model were posted to the Commission's website prior to this workshop and are available on the Commission's website.

I'd like to spend a couple minutes talking about the energy savings potential from battery chargers. The Warren-Alquist Act requires that the Energy Commission adopt standards for devices that represent a significant statewide energy use. Battery chargers consume up to 8,000 gigawatt hours of electricity per year, and do represent such a significant statewide energy use. Furthermore, because of current battery charger design, a significant amount of energy is wasted as heat by overcharging batteries once they're full.

In addition, the proliferation of hand-held devices and other household appliances make clear that products using battery chargers represent a growing plug load. This analysis clearly indicates that the growing load from battery charges should be addressed in order to meet statewide policy objectives.

This graph illustrates the amount of energy wasted as heat after a battery is fully charged. The standard aims to reduce the amount of energy wasted by up to 40 percent, that's the amount of energy that is being wasted as heat and that's the dark blue portion of the graph here. And this is a fairly conservative approach to setting the standard and we believe it is fully supported by the analysis in the staff report. So, in essence what we're saying is that, in the graph that says "current," or the bar that says "current energy usage," that's about 5,100 gigawatt hours and we're aiming to reduce that by 40 percent, which is about 2,100 gigawatt hours. As that previous line illustrates, there's a significant energy savings realized through the standard and battery charges do represent the second largest potential relative to other devices that standards are being contemplated for, and we'll take a look at a graph that illustrates that point, or a table, I should say.

So, we see that the potential energy savings from battery charges is the second largest potential for energy savings of any other device that is currently being considered for standards. And it should be noted that the first year energy savings for battery charges – and these particular numbers are not in this table – the first year savings from battery chargers for consumer products amounts to 320 gigawatt hours, and that is still a significant

number when you look at these other devices. And the first year savings for non-consumer battery chargers is 400 gigawatt hours. Again, even if we parse it that way, those numbers are significant.

To take advantage of this energy savings potential, the approach that staff took is to set standards that target the battery charger circuitry, not the chemistry of the battery that is being charged, nor the design of the product that the battery provides energy to. The compliance strategy is fairly straightforward, the objective being to stop wasting energy as heat after the battery if fully charged. So, this simple schematic illustrates that point. To accomplish that objective, the Standard revolves around the concept of including a switch in the battery charger that shuts off the flow of electricity after the battery is fully charged. There are several devices in the marketplace that already employ this strategy and are currently compliant with the proposed standards. The incremental cost of complying with this approach for consumer products is in the range of $.40 to a dollar. Based on that incremental cost, the standards are very cost-effective. The necessary components are also available off the shelf and are compatible with existing housings.

In regard to the benefits that would accrue to California by adopting this standard, California will

benefit from the adoption of the proposed standards by saving over 2000 gigawatt hours after full compliance. First year's savings prior to any potential preemption by DOE are estimated to be 720 gigawatt hours. The first year savings from consumer battery chargers will be 320 gigawatt hours and, again, for non-consumer, 400 gigawatt hours. And for the consumer, the energy savings from consumer devices, those 320 gigawatt hours, translates into a savings to ratepayers of $50 million.

So, in summary, energy consumption from inefficient wasteful battery chargers represents a growing plug load. Addressing this problem is key for achieving zero net energy buildings and other critical policy goals, including RPS, and GHG reduction goals under the ARB Scoping Plan. A significant amount of energy can be saved by adopting efficiency standards for battery chargers. Based on staff's analysis of the case report and other information, the approach of inserting a switch in the battery charger circuitry is feasible, cost-effective, and achievable with off-the-shelf components. The Standards, if adopted, will help to reduce the demand for electricity in the state and save millions of dollars for ratepayers. This concludes my presentation and, at this point, if there are any questions or comments from the audience, if you could fill out a blue card and bring those up, I would be happy to hear your

remarks. And, again, for the benefit of the Court Reporter, please provide a business card and state your name and organization.

And first up is Kevin Messner with AHAM.

MR. MESSNER: Is this microphone the best one? I'm talking to the esteemed audience, here. Thank you for the opportunity to comment and thanks for holding this workshop. My name is Kevin Messner from AHAM, the Association Home Appliance Manufacturers. We represent home appliance manufacturers, obviously, from major appliances, portable appliances, and floor care appliances. I want to start off by stating that AHAM and CEC do have times when they can cooperate on issues, and thank you for your support and involvement in the recent Appliance Standards Agreement that the industry reached on major appliances with the consumers groups, energy efficiency advocates, and we're pushing that through, and so that's a good positive development, I think, and show of cooperation. And also, smart appliance is coming down the pike is another area of good cooperation that potentially we can team up on.

Today, the battery chargers, not so positive, we have some serious comments, serious issues of this whole standard. We just wanted to highlight a few high levels and then, I'm hoping, the agenda looks fairly – not real open, but maybe I'm just misreading it, where we have don't really

– we have people of companies that have come in, and flown in, or hope that it will be a give and take throughout the day, and not just a half hour opportunity at the end to really discuss these issues, we hope that throughout the day there can be a real discussion and not us just sitting here watching presentations, although that will be helpful sometimes.

MR. LEAON: Yeah, absolutely. We definitely have time for questions and back and forth, and we're flexible on the agenda, so if we need to take more time, we can.

MR. MESSNER: Okay, appreciate that. Some of the higher level issues I just wanted to raise in the opening were, this is hard to conceptualize for a lot of us on why CEC is doing this for products that DOE is covering and they are statutorily mandated to cover by July 2011. So, why is CEC pursuing this when it will be preempted in a matter of months, or somewhere in that timeframe? So we, CEC, industry, everyone is expending a lot of resources for very insignificant, if any, energy savings net of what DOE is going to do. So, this is a very difficult initial hurdle for us to overcome, is why this is even happening when there's going to be a federal standard, which is going to create large energy savings throughout the country. So, if we look beyond California and look at the country, the energy savings of the country, maybe there are areas of

cooperation where, together, we can work to ensure that DOE standards are done quickly and properly and we would welcome that help. We feel that DOE is on the right track, we are meeting with them, meeting with OMB, to get that rule done quickly and properly. We're not 100 percent enamored with the DOE proposal, but we can work together to get that done quickly, to have a statutory mandate, and also we have agreed and it is in the law, we are used to a three-year lead-in time period for a standard to become effective in the Federal Government, and we have agreed and got the law changed to reduce that down to two years, so we can see these energy savings even quicker. So, that's a big hurdle for us to overcome both conceptually and just in reality on why this is moving forward in a bad economy and tight resources in State Budgets, etc.

The other issue is the process has really not been open, hasn't been transparent, it has not been fair, and in many respects, just one example, the last October workshop, there were a number of questions that we had that could not be answered. We responded – they responded with, "I don't know, we don't know, send us your questions in writing." So, we responded with our questions in writing in November, in January, and then we got a data request and we have received zero responses from that, so it's hard to have an open process and transparent process when you ask questions

and you get, “I don’t know,” send me written questions, and they aren’t answered. Then, we get a request for a February 18th deadline for information for the staff report and the staff reports comes out on the 22nd, that’s four days, that’s included in a weekend, so February 18th is a Friday, I guess you are all able to glean the information from the comments on Saturday and Sunday, and then write the staff report on Monday, and then have it done by Tuesday, assuming you are taking these comments into account. Or, the staff report was already written and it was pre-judged. That is not – it’s hard to, again, conceptualize how that is a fair and open process where you are actually taking comments into account when you have a data request and then a matter of one business day later, you’re able to draft the 60-page staff report based on, supposedly, inputs from our comments. Another example is this workshop. We were given six days to prepare, six business days to prepare, and review the staff report. This workshop is great, we’re glad you’re having it, there’s not a whole lot of time that’s given to folks to actually review it if you would really like some substantive input. Now, we hope that maybe this isn’t the last workshop, maybe we’ll have continual discussion, so we can find common ground and try to work through some of these issues, and that this is not just a perfunctory workshop, check it off the list, and move on to the next item. So,

we'd like to resolve some of these issues if CEC chooses to go forward, even though DOE is going to preempt them in very short order.

The other matter that's very concerning, you talked about it in your presentation, the Warren-Alquist Act, there are a number of things that the Warren Alquist Act requires, one is, "the regulation needs to be based on a reasonable use pattern," but yet you guys are not considering duty cycles and don't appear to have any intention to consider duty cycles, and DOE's analysis has a significant amount of information on duty cycles, so there's not as if this information does not exist. So, the Warren-Alquist Act seems fairly clear that it will have to be considered and needs to be based on this, and it's not. And if there's something I'm missing there, then I'd love to hear it. A significant amount of energy needs to be as part of the Warren-Alquist Act, but DOES is implementing the standard, so what's the significant amount of energy to a razor for a matter of months or maximum of a year that's hardly even plugged into the wall, only plugged in to charge the razor a few times a year, for one year before the DOE's standard – or a few months before the DOE's standard? That's a significant amount of energy? I think that would be hard to justify.

It also requires a reduced energy or water

consumption growth rate. What growth rate is being addressed when you have a DOE standard coming out shortly after your standard? There's not much growth there. If you're putting a standard in, and then, in a matter of months or whatever later, you have a DOE standard, where is the growth? It does not result in any added total cost for consumer over the design life; that's certainly not the case for our products and you've lumped into three categories all the battery chargers in the Universe, DOE has lumped them into 10. Battery chargers are very complicated, each one is different. Lumping them into these categories, especially three, is not even close to an acceptable way to handle this. And the cost for consumers for our products is significantly different than the cost and life and use of other products. A hair trimmer is certainly – I think we can all agree – a different use than a cell phone or a computer. So, just bring that to your attention that it does not seem to be consistent with the Warren-Alquist Act.

With that, we have a number of other comments, I won't dwell into them at length now, but we're very disappointed in how this has been going and we hope that we can resolve some of these issues today and then have future workshops to resolve them. And we would like to work with CEC on addressing the battery charge issues together and get DOE, and let's look at the country as a whole and the energy

savings that could be accomplished there. And with that, again, thank you for letting me speak and I'll look forward to today's workshop and hopefully a very significant amount of exchange between everyone that is interested in this subject. Thank you.

MR. LEAON: Thank you, Kevin. And we will be getting into quite a bit of detail in regard to the staff report and we'll have the presentation from Ecos. We'll also get into some of the technical background, as well. So, I think we'll address some of those technical issues. On the process sign, I recognize there's a lot of frustration on the part of industry with the short review times, and justifiably so. But, we are in a rather unique situation with this proceeding. As you mentioned, DOE is scheduled to adopt a standard in July, so that means we're preempted unless we adopt our own standard before that time. So, we are pushing a very aggressive schedule in that regard. Regarding our process after this workshop, it will be a policy call on the part of the efficiency committee on whether to proceed to the formal rulemaking, but that would be the next step, and we would have to initiate that process probably by the end of this month, and we would have a formal 45-day public hearing probably in the late April timeframe.

MR. MESSNER: Okay, thank you for that. I would

just maybe try to – rushing to push a regulation through because DOE is statutorily mandated to hit July 2011, I don't think, is good reason to rush a bad and inaccurate, in many ways, regulation just to try to beat the clock. I mean, this affects many companies, the consumers, and everything, so we need to do it right, and if DOE has a standard that is going to preempt CEC, it's just a question of whether it's a month later, or a year later, max, or some time in between, rushing to just beat that clock to get a month or two months is not a proper way for a regulation to be pursued. So, I just don't think that's a – that's what we're having a really tough time struggling with.

MR. LEAON: Okay, yes, I appreciate that comment, though I would point out that proceedings relating to the battery chargers, as I indicated in my presentation, go back several years now. There have been past opportunities to participate in the development of the case report, and the standard that we're proposing in the staff report has been based on a very thorough and careful analysis of the data in the case report and also a very careful review of the DOE data. So, while we're pushing the schedule to meet the – to adopt before the DOE preempts, by no means is the analysis, in my view, faulty or not based on sound research.

Okay, next speaker, Alan Mears with Motorola Solutions, Inc.

MR. MEARS: I just have a quick technical question about the supposedly simple solution of inserting a switch into a battery charger. It's unclear whether that's like a power on/off switch for the user, or a battery detection switch? What is that?

MR. LEAON: For those on the phone, staff will be addressing that question in the presentation on the staff report. Do you have any other questions you want to –

MR. MEARS: As long as they will be able to address the question, then.

MR. LEAON: Yes, okay. All right, next blue card, Larry Albert, and I can't quite read that – Power Tool Institute.

MR. ALBERT: Larry Albert for Stanley Black & Decker, representing the Power Tool Institute. Thanks for offering me the opportunity to make comments today. Just a few items now, and hopefully later on we'll be able to follow-up with some more in-depth technical comments on the staff report. Firstly, I just want to state that Power Tool Institute is in agreement with all the comments that Kevin made earlier regarding the procedural issues around the workshops, the timing, the effort it takes on the part of member companies. One additional point that should be made is that the Power Tool Institute, all the advocacy is provided by member companies, engineers, and other

personnel, and so, in addition to having to respond to comments from jurisdictions such as California on potential rulemaking, and so on, we also have the daily tasks that we have to do to sort of keep the company running, right? And recognize that, when California can take a full court effort to kind of move forward with a proposed rule, or a case report, or a staff report, or something like that, it's going to take much more calendar time for that report to be reviewed by industry because the individuals that are doing it have other responsibilities that affect – certainly in my case, personally, product safety and so on. So, we would hope that the Commission and the Commission staff would be mindful of the fact that industry, in order to provide meaningful and responsible comment, needs additional time than perhaps the time that Commission staff has already allocated themselves, right?

In addition, a couple of questions here. The first question is, with respect to the energy savings that you have calculated, is that based upon the one year of anticipated time that you will not have preemption by Federal Rule?

MR. LEAON: Which number? The 2,100 gigawatt hours?

MR. ALBERT: I think it was your previous slide. All right, so I think your second bullet down there is the 720 gigawatt hours per year. That figure, then, represents

the one-year period where the California regulation would be in force without DOE preemption?

MR. LEAON: That's correct.

MR. ALBERT: Does that represent both the combined, so-called large chargers, the industrial chargers, as well as the consumer chargers?

MR. LEAON: Yes.

MR. ALBERT: What proportion of that, then, are just the consumer chargers?

MR. LEAON: About 320 gigawatt hours.

MR. ALBERT: Is that, I assume, a full term of stock?

MR. LEAON: Why don't you come up?

MR. RIDER: Again, I'll go into more detail in my presentation, but that's just the first year of sales, so it would assume 100 percent compliance for one year of sales, and the sales data is available in the model that we put on the Web.

MR. ALBERT: Okay, thank you. And then, with respect to the solution that's being offered, right? A couple questions there, one is the idea of the switch is sort of the terminating process that then eliminates power delivered to the battery, right, has been something that's been discussed over a long period of time. One of the major considerations there with respect to certainly the battery

chargers that are used by the power tool industry is that we have, in fact, mixed chemistries that do require ongoing maintenance power, which I think is recognized in the staff report, and so therefore a switch that completely eliminates power to the battery and after full charge is achieved, is not a practical solution with respect to the utility of these products. This maintenance power is not something that represents irresponsibility on the part of these manufacturers, it's a necessary requirement to deliver the essential utility of having non- or nickel-based batteries available to power tool users. There are only a limited number of chemistries that are truly available to power tool manufacturers for use currently that are actually viable, right, and this is certainly one of them. And we don't anticipate any time in the near future there will be an elimination of nickel-based chemistry. It is the Commission staff's contention that their proposal is not chemistry dependent, right? And they provide some evidence to that, but certainly a solution that says there shall be no maintenance power after a certain time does not support that contention. So, the other question was, is if that's the essential solution that's being offered by the Commission staff, it seems to be inconsistent with the general approach that the Commission staff has taken with respect to incorporating active mode power, which was one of the

primary criticisms of earlier types of, particularly Energy Star, right, their methodology that didn't take into account active mode losses, and looking at purely the maintenance mode as the primary means of addressing inefficiency of battery charging, you know, argues why would it be necessary, then, to invoke active mode, right? Our contention in the past and now is that we look at the comprehensive energy use of the battery charger, both in terms of the combined contributions of active mode maintenance and no-load and, in addition, that we consider that the realizable benefit to the consumer is that it takes into account the actual usage factors that are associated with that battery charger. And so, again, I think we have a disagreement with the Commission staff philosophically and the approach of establishing for separate metrics, each of which will have to be independently met.

Lastly – not lastly, second to the last, there was a comment in the case report that I think our entire industry would probably take objection to, that this maintenance power that's consumed represents a threat to product safety. Right? The power tool institute and all its members take product safety extremely seriously. A great deal of our effort is focused on that. We are frequent contributors and initiators of safety standards and are involved in all significant safety standard development associated with

power tools and Allied Products; in fact, we were one of the leading advocates to bring forth the most recently released Standard UL 2575, which addresses the safety of lithium ion based battery charging systems. So, for the Commission staff to claim that battery chargers that are in use by power tool member companies, right, are because of the fact that they provide maintenance power, represent a threat to product safety, we take objection to that. We would appreciate if the staff could review that comment, right, and provide public retraction. And lastly, we have a fundamental issue with the approach that the staff has taken with respect to establishing a single constant limit for maintenance power, it seems to be contrary with not only the practical nature of battery chargers and how they work, but also the discussion that takes place in the staff report itself, which recognizes that there is a need to compensate for self-discharge of those chemistries that have self-discharge, such as nickel-based chemistries, and that that power that’s associated with that self discharge is, in fact, a function of the size of the battery that’s needed to be maintained. And so, it seems to be inconsistent with the technical discussion that takes place in the report and the recommendation to have a single value for maintenance power. Right? Thank you so much.

MR. LEAON: All right, thank you. Just a very brief

response. You know, our intent was not to specify how manufacturers would comply with the standard, our intent was to be technologically neutral. I think there are other options in terms of how to address the efficiency goal as set forth in the standard, and I think probably during Ken or Suzanne's presentation we'll be able to get into that a little bit more. Okay, I've got two more blue cards, a Pierre Delforge with NRDC.

MR. DELFORGE: Thank you for the opportunity to discuss this important issue in this workshop. I'd like to make two comments, the first one starting with the big picture, looking at the numbers you outlined in your presentation. Battery charger systems today are responsible, or waste over 60 percent, actually 64 percent based on your numbers, which are nearly two-thirds of the energy that they use, which basically means, you know, that energy is not used in a useful manner to power the products. In a context where we have, you know, climate change, which is a severe issue, and where air pollution is causing illnesses and premature death to people in the U.S., I think this is unacceptable to us and to our members that we would let that continue and that calls for urgent and vigorous action. So, with this, I would also like to comment on the issue of the DOE rulemaking in parallel. I'd like to point out that the DOE process has a lot of uncertainties attached

to it, first, that the metrics that are being proposed by DOE have been the subject of many comments by stakeholders, and there's no certainty which metrics are going to be used, and they may be different from the ones that are being proposed by CEC. We actually favor the CEC metrics at this time, we think they will be more effective in harnessing the energy savings. The second uncertainty we see is in the product categorization. Stakeholder comments, including IOUs, NGOs, and also industry, as evidenced by the notes from the December 6th meeting of AHAM and PTI with DOE shows that there are questions about this categorization and that there's no evidence that we would be able to meet the schedule that is currently being pursued by DOE. The last and maybe most important uncertainty with the DOE process is in the stringency of the standard that will be implement, though clearly DOE has a different constituency from California, from CEC, it's much broader, does not necessarily share the same goals that California is pursuing goals with AB 32 and zero net energy, and has the strong leadership around climate protection which is not necessarily shared to the same level by DOE and its political constituency. So, for us, it is critical that we continue to pursue a strong and urgent approach to addressing this 60 plus percent energy waste into our systems in California. Thank you.

MR. LEAON: All right, yes, thank you for those comments. You know, getting back to the DOE issue, we're not certain what DOE is going to adopt, we're not certain what efficiency levels are going to be attained through whatever DOE promulgates. We have had some discussions at the staff level with DOE and one of the things we would like to see them do in their Notice of Proposed Rulemaking is at least include an option in that NOPR to have a similar standard as to what is being proposed in California; whether that happens or not, we don't know. But if that were to occur, it would at least provide an opportunity for harmonization and, I think, address some of the concerns out there about what's DOE going to do and what's California going to do. But from our perspective here in California, we want to continue with our proceeding. We think, even with DOE preemption, there's still going to be energy savings that can be attained through the standards that we adopt, and therefore moving forward with this proceeding.

Okay, next blue card, Ric Erdman [sic] with Philips Electronics.

MR. ERDHEIM: I was going to say good morning, but I just looked at my watch which is still set in East Coast time, so it's "good afternoon." Ric Erdheim with Philips Electronics. Good morning or afternoon is appropriate. I have two points. First, I want to get back to the

procedural question that Kevin started to raise. Your slides indicate that in October 2010 the staff held a workshop to take comments on the case report, but of course, as you remember, the case report was not released before the hearing, so we really didn't have a workshop on the case report. So, to your credit, you scheduled a – I can't remember if it was a conference call or a Webinar – where we went over that. We asked numerous questions for which we were not provided any answers, and someone – I think it was you, Mike, but I'm not 100 percent sure and, so, if I'm wrong, I apologize, said, "Well, would you please send us your questions," which we did on November 1st. To the best of our knowledge, no one has responded to those questions, making it, in our view, impossible to evaluate the staff report, or the case report. And, so, question 1 is, do you think you have responded to the questions? And if not, are you planning to respond, and if so, when? If I could make one additional –

MR. LEAON: Yes.

MR. ERDHEIM: -- we also made – all of the companies made – extensive comments that you have on your website, you have addressed some of those comments, or you've categorized some of the comments, but I can tell you that, from our point of view, we feel that you have not responded to the overwhelming majority of comments that we've, at least,

raised. And so, my question again is, do you plan to respond to those comments? If so, when? And I would just say that we're put in the position – I know you want to proceed, but we can't provide meaningful input if we can't get responses to questions to understand what exactly is being proposed.

MR. LEAON: Okay. Fair enough, Ric. We did look at all the written comments and one of the comments that we saw on numerous occasions was "use the DOE data." And then we had a lot of technical questions on the Ecos report and their data. We spent a lot of time looking at the DOE data to see if that was a better dataset for us to use, and what we found was that there was some manufacturer data provided that we hadn't looked at before, but that a lot of the data that DOE was relying on actually tied back to the Ecos report and data developed through that process. So, in a sense, you know, we were thinking this is kind of a circular thing here where a lot of the information being relied on by DOE is the same information that we're relying on in the case report with the exception of some of the manufacturer data. So, that figured heavily in how we proceeded. Given that we looked at the Ecos data, we looked at the source documents, and there are a lot of technical questions that have been raised by industry, and we didn't respond to those directly, granted, but we did consider them in looking at

the Ecos data and our conclusion was that the Ecos data, the data that they relied on, was the best available data, and that the assumptions were reasonable. And once we had reached that conclusion, our next step was to develop the spreadsheet model and run the numbers. And after running the numbers, it showed that it was going to be cost-effective and we were going to achieve energy savings. And we were still in the pre-rulemaking phase and the rules under the formal rulemaking phase, if we go to that, under the 45-day comment period, will require us to do point by point response to each comment. But in this proceeding, we did include responses to some of the comments in the staff report, we had grouped comments together and, understand, it wasn't a specific response, point by point, to the issues that had been raised in the letters, but we felt that our analysis showed that the data that had been developed through the case report was appropriate for us to proceed.

MR. ERDHEIM: So, I take it from that that the answer to your question is, no, you're not going to respond to the November 1st list of questions?

MR. LEAON: Well, what I think we had hoped today was that the presentations that we're going to see from staff and Ecos will, in large part, address many of those concerns. I'll wait to hear your feedback later today if that's not the case.

MR. ERDHEIM: Okay, and if it's not the case, are you going to respond, then, before? Here's the problem, if it's not the case, your next step is to go to 45-day rulemaking, so we've gone through this entire process, and I realize that there have been opportunity for comments, but if we don't have the data to make comments, then the whole process has been a charade. So, how do we get to a point where we can have a discussion? Again, this is what Kevin was mentioning about sitting down and working through these issues, and right now, you put out stuff that we say we respond and then you just put out more stuff and we don't ever have a dialogue. So, how do we get to a point where you can respond to the questions that we have so that we can make more informed comments on what you're proposing?

MR. LEAON: Well, let me say this first. I think, in some respects, we've been talking across purposes. A lot of the manufacturer comments that we've received have been focused on the assumptions and the data sources behind the Ecos data, and we did look at that. So, while it wasn't a point by point response, we did consider the comments that have been raised in looking at the data that's been provided and, again, we thought it was reasonable. And what we're looking for from industry at this point, if you have data that you think is better than what Ecos has, you know, give us those assumptions and we'll run them through the

spreadsheet model, and we'll see if it changes the outcome of the analysis. But, to spend weeks and back and forth over – there were questions over the data that we've already determined that we think is reasonable, I don't think, is a productive use of the time in this process.

MR. ERDHEIM: I would agree that it would be better to, if we were sitting down talking together, that's not happening. So, let me just give you one example –

MR. LEAON: Well, let me speak to that point, Ric. We are always available. If you want a meeting with us, we are more than happy to meet with you individually. Pick up the phone and we'll be happy to schedule a time to meet individually, have one-on-one discussions.

MR. ERDHEIM: Okay, I appreciate that, thank you. So, let me just use – I wasn't going to get into this now, but since you raised this, in the report on page 42, you have for duty cycles, you say that personal care products are never unplugged. Just trust me, it says that. The DOE report evaluated 57 different products, 18 of which they found, are almost never plugged, and that includes grooming products. Now, I've been before this committee for five years, I went back and checked and it was January of 2006, where I waived around my beard trimmer and I brought my beard trimmer, I won't go back and get it, but I trim my beard once a week, it gets 13-15 trims per charge, which

means I charge the thing four times a year, the charge is three hours a day, three hours at a time, assuming I let it go too long, maybe it charges one day a year. And yet, the duty cycle that you're using says personal care products are never unplugged. I mean, that defies logic. You don't have to respond to that particular issue now, I realize that's a specific example, but that's the sort of thing when you say we evaluated the information and we thought that was better, and the DOE has much more detailed information, information that is supported by common sense. I mean, why would anyone leave a beard trimmer plugged in 365 days a year? That simply defies common sense, and yet that's the assumption that you're using. So, let me get onto my second point because I don't want to belabor this, I know you've got a lot to do today. In the report on page 9, you contrast – and this gets to the point about the categorization – the reports says, well, we've got three categories compared to the Department of Energy's 10 categories. I think that's actually a misleading statement because one of your categories is something that the Department of Energy didn't include in its evaluation, the larger industrial products, so, really, you have two categories of comparable products, and one of them is inductive charge, and we thank you for a separate category, so the Department of Energy has one category of inductive charge. So, really, what we have is

you got one category for all non-inductively charged consumer products whereas the Department of Energy had nine, and we argued before the Department of Energy that's not enough because you've lumped products with different functions and different uses and different factors together. So, I would just make the point that that statement about categorization is very misleading and when you merge products together which are completely different, and average them out, well, yeah, the average may look good, but if someone said, you know, you can drown in a stream that's on average only six-inches deep because you might be in the part that's 20 feet deep. So, I think the process – and I don't mean to belittle this, I told the DOE this also, I think what you're trying to do is extremely difficult because the scope of products are so different, but at the same time, just lumping them altogether is definitely going to give you results that don't make any sense. That's what you're hearing frustration from, from many of us. Thanks.

MR. LEAON: Thank you, Ric. Do we have any other comments at this time? Oh, we're going to open up the phone lines. All right, the phones are unmuted, if there is someone who would like to make a comment, if you could introduce yourself, name and organization? Any comments from the phone? Was that a yes?

MR. DENKENBERGER: This is Dave Denkenberger at Ecos

Consulting.

MR. LEAON: Can you state your name one more time?

MR. DENKENBERGER: Dave Denkenberger at Ecos Consulting.

MR. LEAON: Okay, go ahead.

MR. DENKENBERGER: So, just a point of clarification of the number of product categories. There are actually three consumer categories because the third one is exit signs, and furthermore, the DOE has only eight categories that correspond to the consumer chargers because the CEC is not covering the DC chargers, which compose two of the categories that DOE covers. Though the third comparison is three from CEC and eight categories from DOE.

MR. LEAON: Would you say that last part one more time? You were breaking up. Okay, the person from Ecos, could you say that part one more time, that last part? We didn't really catch it? David?

MR. DENKENBERGER: The last part was that there are three consumer charger categories for the CEC that correspond to eight DOE categories.

MR. LEAON: Okay, thank you. And for the folks that are on the phone, if you don't want to speak, if you could mute your phone? We're picking up a lot of background noise. Thank you.

MR. ERDHEIM: Mike, a clarifying question. I

understanding you may have difficulty because of the phone lines. Is he saying that exit signs are a consumer category?

MR. LEAON: Let's bring up the phone lines again. David, did you get that question? David?

MR. DENKENBERGER: Yes, I did get that question. That's true, the DOE is not covering exit signs. So, I guess that would be two to eight, then.

MR. ERDHEIM: Two, one of which is inductive charge for both, so for non-inductively charged consumer products, California has one and DOE has eight, I won't even argue about eight or nine.

MR. LEAON: Thanks. I think we need to move the agenda, we're way behind.

MR. MESSNER: Could I – just one quick because this guy is the technical Ecos guy on –

MR. LEAON: Briefly. And state your name, please.

MR. MESSNER: Kevin Messner with AHAM. This data that was on the website said that you looked at one – I think it was razor – one razor – out of the whole product category for razors, and that certainly is not a statistical sampling by any stretch of any statistician's mind. Could you please explain why you only looked at one product and whether or not it's in what category or not, that would be helpful.

MR. LEAON: David, did you get that question?

MR. DENKENBERGER: Well, basically we tested other products and we felt they were representative samples. I mean, it's difficult to get a representative sample from all different types of products.

MR. MESSNER: Well, I understand it's difficult, but that doesn't mean you shouldn't do it. I mean, battery chargers are tough, you don't lump everything together, that's what's so frustrating – this is tough. It's going to take some time. You're going to have to put your arm to the whatever, the elbow to the grindstone, or whatever the saying is, and get it done. It's tough. You can't lump one razor with a bunch of products and say this, a regulation makes. I mean, that's what's – it's hard to conceptualize how this is being done.

MR. LEAON: Okay, I think we need to cut off comment at this time and we need to move the agenda, we're more than an hour behind, I believe, or almost an hour behind.

So, let's move on to Lighting Controls and I'd like to introduce Gary Flamm.

MR. FLAMM: Well, good morning. I'm going to change gears for a few minutes here. This is a project that I've been shepherding through the Title 24 effort for a couple of years. My name is Gary, I'm a supervisor with the Building Standards Development Unit. So, at the same time, this, a

Title 20 pre-rulemaking effort is going on, we also have the 2013 Title 24 pre-rulemaking effort going on, and so this is an effort that crosses both of these Codes. So, there are existing lighting control requirements in Title 24. As a matter of fact, we've had lighting controls requirements from the beginning of Title 24 and, along with the requirements for controls, both manual and automatic controls, we've also developed specifications for those controls. And those controls already need to be certified, according to Title 24, so the database that the Energy Commission administers has both Title 20 products, as well as Title 24 products. So, Title 24 products that need to be installed apply to building projects that are regulated under Title 24. And under these products that we currently regulate and have regulated for many years, there are devices that we've recently classified as self-contained devices and as field assembled components such as an energy management control system. So, the Appliance Efficiency Regulations are different than the Building Standards. The Building Standards apply to products that can be installed in a building that's under Title 24 construction, while the Appliance Efficiency Regulations apply to products that can be sold or offered for sale in California. So, this proposal is to move existing requirements from the Title 24 Building Standards to the Appliance Efficiency Regulations,

and the changes are going to be proposed also in Section 119 of Title 24 in the current pre-rulemaking efforts for what we're calling the 2013 Title 24 Rulemaking Proceeding. And in the end, the intent is that the Title 20 and the Title 24 regulations will complement each other.

So, the proposed language that we have now for both Title 24 and for Title 20 has gone through a significant collaborative effort with the National Electrical Manufacturer's Association. We've been working with their Controls Committee and stakeholders in a Title 24 process and Energy Commission staff. We basically have taken an existing language and we've separated it into two different bins. So, where we've ended is, the language that we're proposing to retract from Title 24 are going to be what we're now classifying as self-contained lighting controls. Those are individual modular's that are unitary lighting controls, which require no additional components to make them work, such as something like a wall box dimmer, or a wall box occupant sensor, or a timer switch box. Then, in Title 24, we will leave what we're going to call lighting control systems, and those are where you have two or more components that are installed to comply with the Title 24 requirements. Currently, it's a little clumsy in Title 24 because we require both unitary lighting controls, as well as lighting control systems to be certified to the Energy

Commission database. And if you can imagine, when you have a very complex system and you have to certify that as a device, the building industry is finding that a little clumsy, so we intend to propose a different construct for the Title 24 lighting control systems. So these lighting control regulations, the devices, have been developed over many years. Title 24 has been around, I believe, about 30 years, and so, in addition to the requirements for lighting controls to be installed, we've also had lighting control requirements. The Title 24 requirements are already accepted by the industry as a standard for reliably delivering the energy savings that were predicted in the analyses. This move will improve the quality, reliability and consumer satisfaction with those lighting controls available through retail and, as I said, this is going to simplify the Title 24 requirement, which will lead to improved compliance. And that's the end of my presentation. The proposed language is available in this process, this workshop, so you're welcome to go over that. Are there any questions? Yes, sir?

MR. ERDHEIM: Hi, Gary. Ric Erdheim with Philips Electronics. We're, of course, a member of NEMA. You mentioned that you sat down with NEMA and worked this out?

MR. FLAMM: Yes, I've been working through – it was coordinated by Justin Newmann through the Lighting Controls

Committee, headed by Doreen Manisha – we say her name wrongly, I apologize. And we've had a number of conference calls, yes.

MR. ERDHEIM: So, the point is, you were able to sit down with NEMA and work this out?

MR. FLAMM: That is correct.

MR. ERDHEIM: So, Mike, I just would wonder, NEMA also represents the emergency lighting section and I don't understand why we can't have a process similar to the one that Gary did to address emergency lighting.

MR. LEAON: Well, I think we are engaged in a collaborative process.

MR. ERDHEIM: No, Mike. Gary sat down with the industry and there were back and forth discussions. This is – we're shooting past each other in the night. We don't think you've responded to our questions on emergency lighting, maybe you don't think we've provided fair comments, that's fine, but we should be sitting down outside of this regulatory process and do what Gary did with similar people at NEMA, it would be a different section, and working through this. We're talking about life safety equipment. We can't afford to make a mistake. This is not being done by the DOE, so we don't have the same time constraints, and we would urge you to sit down with the section. Now, you may find that you can't come to an agreement and that's

fine, but I can tell you, our members think that there's a fundamental misunderstanding that the Commission has and that Ecos has in terms of how emergency lighting works. And I don't mean to berate Gary, who we've had a long relationship with, but the point is, is that you can't sit down with NEMA, and that's not happening in this process, and we'd urge you for emergency lighting to adopt a different approach.

MR. FLAMM: Okay, we can certainly have that conversation. Okay, we're going to open up the phone. Any comments from anybody on the phone, please? Well, hearing none, I guess we'll close the phone, then. So, we will continue to receive comments on this proposed language. I have already been in dialogue, continued dialogue, with the NEMA Controls Committee, and there's a little more tweaking that we're going to do to the proposed language. We need to make sure that definitely, the Title 20 and the Title 24 language complement each other, so just a little bit more tweaking, I anticipate. And if you have any comments, please send them to myself or to Ken Rider and we will continue to work on this. Thank you.

MR. RIDER: Our next presenter is on the phone line, so let me see if I can pull her up, specifically. Ayat, are you on the line?

MS. OSMAN: Hi.

MR. RIDER: Okay, I'm going to pull up your presentation. Can you see your presentation? And as soon as you start talking, I'll mute everyone else.

MS. OSMAN: Hello.

MR. RIDER: Hello.

MS. OSMAN: Can you mute the lines?

MR. RIDER: Are you there?

MS. OSMAN: Yeah, I'm here.

MR. RIDER: Everyone else is muted now.

MS. OSMAN: Okay, thank you. This is Ayat Osman from the California Public Utilities Commission, I work in the Energy Division, Energy Efficiency, specifically. I'll be giving a brief presentation on current State Energy Policy and the important role that energy efficiency plays in the energy sector to meet aggressive state energy efficiency targets and decrease the greenhouse gas emissions, and therefore the impact of climate change. Next slide, please.

In 2003, the first formal energy policy that was adopted by the State agencies, the CEC and the California Public Utilities Commission, was put in place to address the energy crisis in California, and that was the Energy Action Plan. The Energy Action Plan established energy efficiency first in the loading order, to meet energy needs. The second update to the Energy Action Plan put together,

coordinated implementation of the plan that captured the various Governor Orders, IEPR and CPUC and CEC Proceedings, and legislation. The most recent 2000 update of the Energy Action Plan highlighted the most important development of California energy policy in the last decade, or two decades, and that was the Greenhouse Gas Emission Solution Act of 2006, AB 32, which sets and economy-wide cap on greenhouse gas emissions at 1990, no later than 2020. The update of the plan calls for the need for coordination and integration between agencies and across all targets, resources, areas such as Energy Efficiency and Demand Response, as well as energy efficiency and distributed generation programs with the focus on consumer decision-making regarding energy use. The update also calls for the need of integration with local governments, developers, and builders in the private sector to produce the impact of land use, transportation, and electric infrastructure and greenhouse gas emissions that are not typically governed by the State's agencies. Next slide, please.

Energy efficiency was recognized as the tool for addressing greenhouse gas emissions in the energy sectors and meeting AB 32 goals. Assembly Bill 21 required the CEC and the CPUC, and also the publicly-owned utilities to set statewide energy efficiency targets for 2017. The agencies concluded that the goal of the state should be to achieve

all cost-effective energy efficiencies. Three of the most powerful strategies that are in use are Building Codes, Appliance Standards, and Utility Energy Efficiency Programs. Next slide, please.

Given that both appliance and building standards have continued to grow in size in their adoption, and cumulative conservation phasing, some other utility energy efficiency programs have remained about the same. This called for the states to employ a new innovative approach not yet tried. In response, the California Public Utilities Commission has launched a strategic planning process to develop a comprehensive long-term strategy for sustainable energy efficiency savings. These strategies are called “Big Bold” Programmatic Initiatives and were adopted by the CPUC in 2010 through 2012. When the strategic plan was established in 2006, there was a recent update in 2011. The Big Bold Programmatic Initiatives are only residential new construction should meet zero net energy by 2020, commercial construction by 2030, and HVAC will be transformed to ensure that its energy performance is optimal for California climate. Also, another goal was to allow all eligible low-income customers to be given the opportunity to participate in low-income energy efficiency programs by 2020. Next slide, please.

The Energy Action Plan update has established some

of the accomplishments, as well as the next steps. The accomplishments were – one of the accomplishments was that both the CEC and the CPUC, as well as other agency endorsement of the zero net energy goals, as well as the aggressive energy efficiency goals. The next steps are for the statewide strategic plan to serve as a roadmap for actions needed to achieve cost-effective energy efficiency potential in California. Some of the highlights of the next steps are the need to improve Code Enforcement Building Codes and additional and more stringent Codes for buildings, as well as Appliance Standards. And also, the partnership with the local government and other market players. Next slide, please.

The strategic plan calls to expand Title 20 and Title 24 to address all significant energy end uses needed to reach the goals of ZNE. There is also a need to address the time sensitive opportunities to inform the next Title 24. As we all know, the post-Title 24 and Title 20 have a formal rulemaking process, as well as opportunity to propose innovative Code changes that can enable zero net energy; however, one of the hurdles to ZNE is the strong divide between the regulated and non-regulated loads, which are plug loads. The non-regulated plug loads could reach 70 percent or more of energy consumption, and these plug loads are expected to grow. Maybe one message that was clear in

one recent publication by David Kaneda and co-authors in the 2010 ACEEE Summer Study was – the study was called “Plug Load Reduction: The Next Big Hurdle for Net Zero Energy Buildings Design.” And there was a subtle, but very strong message that highlights how energy compliance and modeling programs separate regulated from unregulated loads. In the study, the authors chose a case study of how the design team was able to adjust lighting and HVAC loads to less than 50 percent of traditional buildings. However, the unregulated plug loads in high efficiency net zero energy buildings have been estimated at around 40 percent of the remaining plug loads. This calls for the need for coordinated approach across the design teams between architects and engineers, and the high performance design practice. That should truly account for both regulated loads and unregulated loads. One of the particular ways is simple. If you look at the plug loads, reducing plug loads will in turn reduce the remaining plug loads needs for HVAC, and therefore energy consumption in a building. Next slide, please.

This is a slide that was originated from a study named “Assessment of Technical Potential to Achieving Net Zero Energy Buildings in the Commercial Sector,” and the study showed that ZNE is actually easier to achieve in a refrigerated warehouses, for example; however, when you look at hospitals and labs, they are very difficult to achieve

ZNE. On average, a two-thirds reduction in energy use is the required approach of ZNE. There is a lot of untapped energy savings that could be harnessed, however, we need to be creative and think in different terms to achieve market transformation. Next slide, please.

These are just two slides showing – sorry – two graphs showing energy consumption in an office building on the left, top, and in a residential building on the lower right. And the key point to take away is that the miscellaneous use dominates the growth in electric demand in the residential sector, according to the American Energy Outlook of 2010. Another takeaway is that we see that office equipment and plug load is the third largest end use behind HVAC and lighting in California businesses. Next slide, please.

Again, this slide just shows the energy use by product category. If you look at the plug loads, they have about 28 percent share of all the other plug loads in that category. Next slide, please.

The CPUC Energy Efficiency Strategic Plan has been using what we call an Action Plan to articulate how to implement the Strategic Plan and one of the most recent published action plans is the Commercial ZNE Action Plan and it is designed to achieve the milestones identified in the strategic plan and continue working with the broader

stakeholders from the community, such as the State agency, Building, Industrial, and Utilities, and Manufacturers. Next slide, please.

The ZNE Action Plan has examples of how – one of the strategies that was called out in the Strategic Plan in the Codes and Standards chapter calls for expanding Title 20 and Title 24 to address all significant energy use. And this example shows some of the key actions that need to be achieved to get to the milestone. And plug loads have been identified as one of the major areas that need to be addressed. Next slide, please.

This is another example from the ZNE Action Plan and it calls for utilizing plug load technologies within the commercial sector. And, I mean, you can read this later, but the basic message is that we need to pay attention to this area as it relates to the Strategic Plan goals and the Energy Efficiency goals of California. Next slide, please.

Finally, the study that was done by Ecos had some brief recommendations to address the plug load questions, and some of the recommendation is the consideration of office electronics in Title 20 and consideration of switch outlets in Title 24. Title 20 could address some commercial plug loads that are increasingly ready for Standards consideration, and Title 24 could consider a requirement for switched outlets. For example, private offices and

conference rooms could be required to have a certain percentage of their wall outlets controlled by a single switch located near the room's entrance. Automatic controls already effectively used with hard wiring could be required to operate some more outlets, as well.

While the programs and mandated regulation have had a vital role of improving the energy efficiency of office plug loads, the increased reliance on office electronics, coupled with the growing need for faster, higher power, higher quality equipment, and has resulted overall in increasing plug load energy consumption. This area needs to be researched and innovative approaches need to be employed both through voluntary programs, as well as regulations to ensure that California meets its energy efficiency goals, as well as greenhouse gas reduction goals. Thank you.

MR. LEAON: All right, thank you, Ayat. Do we have any questions in the room? Okay, thank you very much for your presentations. We don't have any questions for you in the room. Once again, I think Ayat's presentation helps to highlight some of the policy challenges that we're facing in the state. At this point, I think we have an option here of breaking for lunch now and maybe taking a short lunch, maybe a 45-minute lunch, before we get into the staff report because I'm sure, you know, there will be a lot of questions on that presentation. So, if I can see if there are any

objections to doing that, or if we have any other – yes, go ahead, Kevin.

MR. MESSNER: Yeah, I mean, if I'm the only one, I'd prefer to move forward just because it's – I'd prefer to keep moving forward and get the staff report and try to knock out some on that and then go into it, but if I'm the only one, then I'll defer to everyone else. But I'd like to keep it going.

MR. LEAON: Okay, I think – does anybody have an issue with continuing? Why don't we do this, why don't we take a 10-minute break, and let's come back and we'll get into the staff report. So let's resume no later than five until.

(Off the record at 11:42 a.m.)

(Reconvene at 11:55 a.m.)

MR. LEAON: Okay, if everybody could take their seats, let's get started. Okay, our next presentation will be from Ken Rider of the Appliance and Process Energy Office. Ken will be talking about the review of the staff report and the analysis that went into it, and Ken, whenever you're ready.

MR. RIDER: Yeah, thanks for the introduction, Mike. I'll just tear into it. So, I want to start by stating what has been considered in the staff report that was published online and what has yet to be considered, but will be

considered through the course of this pre-rulemaking and rulemaking process.

So, we have considered so far the IOU case study, we have looked at the U.S. DOE preliminary analysis. We have looked at the stakeholder comments up to this point. What we have not considered in the staff report, which gets to, I believe, AHAM's comment about timing, is we have not yet incorporated any data that we've received into that analysis from the data requests, and we obviously haven't covered any comments in this workshop comment period, as of yet.

So, as Mike mentioned, we looked at the DOE preliminary analysis, to the smallest of details as far as it was publicly available, we found that the majority of sources, or at least a large portion of the sources, were from PG&E. We also found that a lot of the information was NCI estimates, and I believe that stands for Navigant Consulting, and the exact assumptions going into that were unclear in the public documents. Two areas we really focused in on, because they're really the core of this rulemaking, are the duty cycles and the costs, and we really looked closely at those in the DOE information. I also wanted to say that, although we looked for industry information per comments, we didn't find any information directly from industry. What we did find is information that had been altered by Navigant in some fashion. So, this

is one of the reasons why we had the data requests is to get specific information, rather than aggregated or less specific information that was available in the public DOE analysis. And I was trying to figure out a good way to express exactly, you know, where the information was coming from, at least in terms of duty cycle, and so I just made a bar graph of the number of citations for the Navigant conclusions, so they have available the list of their consensus information, and the consensus information is primarily based on PG&E information, which obviously was available to develop the case report with. Also, a large part is what is called NCI's generic, which is a Navigant Consulting estimate, and there were a few sources where they cited industry interviews. And, again, we didn't have any idea what those interviews entailed or what information you had provided. The industry inputs were related to power tools and hedge and weed trimmers, at least in terms of duty cycle of battery chargers. We also looked into cost. The case study estimates cost based on the cost of necessary circuit changes. The DOE cost is based from two sources, one they paid iSuppli to actually tear down various levels of efficiency products, and the other source was Manufacturer interviews. The costs that we found in the DOE preliminary analysis were extremely high; we compared the Energy Commission proposed levels to similar levels in the

DOE preliminary analysis and found, for Class 2, and to clarify, since we don't have that in the staff report, Class 2 contains products such as cordless phones, shavers, and MP3 players, that incremental cost was a little bit under $17.00 to improve, let's say, a cordless phone charger from baseline level to a compliant level. And for Class 4, which is power tools, laptops, and universal chargers, it was a little bit better, but it was still really high, about $12.50, and we found that these costs were inconsistent with the expected design changes that are detailed in the staff report. So, then, we decided that the cost information and the duty cycle information were not superior to the case assumptions, and we also found that – let me go back to the duty cycle for a minute – we also found that many of the duty cycles assumed in the DOE analysis were either identical, or very similar to the case duty cycle assumptions, and there were a few exceptions, but for many cases, they were very similar.

So, we decided to go continue the rulemaking process based on the Ecos information and, to do that, we created a battery charger model so, that way, we could provide all stakeholders with a view of exactly what the assumptions are that the rulemaking is based upon, and how those calculations are carried out. The model provides information on statewide energy use, so the estimate of the

current consumption of battery chargers on the market today, the unit and statewide energy savings, the cost of benefit ratio, which is really important in determining cost-effectiveness, and also the sensitivity in the analysis and, again, the source data was the case report. So, the energy savings were calculated using the duty cycle and the baseline power consumptions, and the assumed compliant power consumptions, and the statewide energy savings, pulled in sales information and estimated compliance rates, so we discounted savings by – we didn't count savings for products that are already meeting the standard.

We provided the model in two locations, one is in Appendix B of the Staff Report, and another is an Excel sheet that has been provided on the Energy Commission website. The results from the model – and I would be happy to answer any questions about those Appendices at the end of the presentation – the results were that the statewide energy consumption of battery chargers is estimated to be approximately 7,000 gigawatt hours per year, and that the energy savings for a completely compliant stock, just to be clear, would be – so, that is if all chargers on the market today complied with the standard – we would be consuming 2,000 gigawatt hours less per year. The cost benefit ratios were all positive, meaning that the consumers are estimated to actually come out with a net positive benefit financially

from the energy efficiency, and they were all greater than 3, which mean that, even if we are off by a factor of 2 or 3 on assumptions, we would still be cost-effective for the proposed standard. And when I say “are all positive,” I mean for each product type that we considered.

I’m going to go into a little bit more detail about what we meant by implementing a switch to enter maintenance mode, and how that can bring products into compliance. I am going to echo what Mike said, which is this is not, by all means, the only way that Manufacturers can comply with the proposed standard, it’s just a simple way that they could. For large battery chargers, it’s a little more complicated than just implementing a switch, but that is also still a viable improvement, but for large battery chargers it takes a little bit more than just a switch. So, I’m going to go through the switch concept.

Here is an example of a battery charger scheme that does not incorporate any switch, and the significance here, you notice the watt draw of this battery charger remains fairly constant during this 24-hour test, which means that, whether it was charging the battery, when the battery was full, I don’t know, but no matter what, over this 24-hour period, the power draw never varied, so this type of circuitry does not react to the concept that the battery is charged in any way. With implementation of a switch – oh,

and I would like to give credit, this graph is pulled from the DOE TSD Technical Report, and when you implement the switch, essentially it detects when the battery has been charged, and then enters a lower power maintenance mode. And to implement that kind of switch that we're talking about, it would be post the power supply, to answer the question asked earlier, and it is essentially a transistor. A transistor is a type of switch, for those who aren't electrical engineers, and you need a control circuit that tells the switch when to turn on and when to turn off. And that control circuit would vary – it could range from a timer, which would just say six hours you would turn this off, or it could be more sophisticated and measure whether the battery was actually full or not by methods that would be appropriate. Different methods are appropriate for different battery chemistries. So, to demonstrate how this leads to compliance, I've included this graph, and I'm going to take a minute to go through it.

These are two different battery chargers that are identified here. I believe the source of this graph, initially, was from an Ecos presentation. They're both similar capacity batteries, but as you see, this Nickel Metal Hydride -- that is what NIMH stands for -- battery is one of those ones we discussed earlier that has just a constant power draw, whereas the lithium ion, for reasons

that may not be related to efficiency, has a switch, and it goes to low power mode. Well, if you were to implement this switch and turn the power off – not the power off, but to a low maintenance mode level, you would save 46 watt hours and that would be enough to comply with the standards. So, it's not to say that we're going to go to zero, but to provide – I think the standard says .5 watts, so to go to that level you would meet compliance for these by implementing that in the Nickel Metal Hydride charger.

I want to take a second to talk about power factor. The standards are proposing the two different levels of power factor correction occur for small chargers and for just one level for large chargers, one is a passive approach which would not require necessarily any kind of active chip to adjust the power factor, and another one – and that is the 0.6 level that's suggested, or the 0.55, the level that's suggested in the case report, and then there's the active level, which would require a chip and would be at a .9 or greater level. The savings and benefit of this do not occur within the product, it doesn't really reduce the power draw of the product, instead it draws energy from the wiring and house of the commercial building, or wherever this product is plugged into. It draws that energy more efficiently and reduces the losses on the line, or in the building wiring. And that's how the benefits were

calculated for the incremental costs that would be incurred by incorporating power factor. And that approach is outlined in the case report, I believe, in appendices to the case report.

I'd like to take a minute to talk about the test procedure that we're proposing – well, actually, we've already adopted this test procedure, but I'd like to talk about this test procedure for a moment and it yields three main metrics, 24-hour energy consumption, so the battery charger's measure is tested for a 24-hour period, and the energy that it consumes over that period is one key output; another is maintenance mode power, which measures the average power of the battery charger over the last four hours of the test; and the last is no battery mode power, which measures the draw without any battery in the system, and the test also outputs power factors so that we can measure that. The test procedure measures what is called battery charger system, and the battery charger system includes the power supply, the charger, and the battery, so all three components are measured in the test. And this is also consistent with the DOE test method approach. They still haven't issued a final rule on it, but at least their initial proposal is consistent with what California has adopted in 2008. One issue that has been brought up by stakeholders is whether EPSs are measured or not, and they

certainly are measured as a part of the test procedure, there are several reasons for that, first, this doesn't buy us internal vs. external power supplies, the second is that many of the external power supplies have been exempted and not regulated as part of the external power supply standards that were adopted several years ago, I guess five years ago now, and those standards have a specific exemption for battery charger external power supplies.

The battery charger test procedure describes how batteries are selected, which is an important part of measuring the battery charger system. It requires that external functions not related to battery charging be turned off, so, for instance, a laptop, you wouldn't measure it with the laptop on, you would turn off the computer part and just try to get to the battery charger energy. The methodology covers all battery chemistry and has some specifics that address certain needs for particular chemistries. And it also covers all configurations, so whether the battery is inside of the product, whether it gets taken out of the product and put in the cradle, the configurations are all covered in the test procedure, as well, so it was very comprehensive.

So, I'd like to talk about the standard that we're proposing in the staff report. I'm going to start by talking about small battery chargers. There is, right along

with the measurements that the test procedure makes, we have proposed standards. So, for the 24-hour energy, the staff report is proposing that the amount of energy consumed in a 24-hour test period be less than 1.6 times the battery capacity plus 12 watt hours. For the maintenance mode, which again is the measured average power of the last four hours of test method, that that be less than .5 watts, less than or equal to .5 watts. And for no battery mode, which again, there is no battery in the charger, connected to the charger that must be less than 0.3 watts. Now, we also are proposing that power factor standard that I mentioned earlier, and whether it's 0.55 or 0.9 depends on the input power drawn from the circuit. The current proposal is related to amperage of – I believe the line is drawn at 1 amp, but we certainly look for feedback on where the best location, where the line should be drawn.

I would also like to present an alternative maintenance approach which gets to PTI's comment that this alternative approach, that maybe we consider scaling the maintenance mode standard by battery capacity, and given some of the information we've got in the recent – in the last month – this may be a more appropriate approach, it is not outlined in the staff report, but we are presenting it today for feedback from industry. There is some basis behind at least this initial proposal. The idea here is

that we allow batteries to counteract self-discharge and with some assumptions, a calculation could be made about appropriate level. Assuming a 3 percent loss of battery capacity per day from self-discharge, and assuming that the battery charger can replace that self-discharge at 60 percent efficiency, we've developed this equation which, as you can see, .03 is tied to this loss per day, and 60 percent is the efficiency that shows up right here, and we believe that this would be perhaps a more appropriate approach. Just to give you an idea of what that would look like in the graph that – this graph is from the case report and it was presented at the October workshop, and that green line there is the 0.5 watt currently proposed standard; the blue line is my best attempt at overlaying this new approach using those assumptions on the last page, so it would actually scale with the battery capacity, but would really start to provide more meaningful additional capacity at the higher capacity chargers that would be looking to charge 100 watt hours or more.

I'd like to talk about the large battery charger standards, so they're a little more complex than the small battery charger standards, there are two tiers. So, initially we would go to a less stringent level and eventually move to a more stringent level. We are proposing to regulate charge return factor at different depths of

discharge at these levels. We're looking to improve the power conversion efficiency, again, power factor. And the maintenance mode, this is a very large change between Tier 1 and Tier 2, we are looking again at maintenance mode and no battery. We have a few separate special product categories, one of them is inductive chargers, as the gentleman from Philips mentioned. This has an alternative compliance option, the concept of this compliance option is that the battery charger really never draws more than 1 watt. And if they cannot meet that, they can also still attempt to comply using the general small charger proposal, which would be more appropriate probably for larger inductive chargers.

Not mentioned in the staff report, but I wanted to bring it up again for stakeholder feedback, is an alternative proposal that was mentioned in the case report for exit signs. Right now in the staff report, we are not treating exit signs separately, but the case suggested we should do so, and we got feedback from NEMA that this is a special case, so I wanted to bring it up in this workshop. The alternative proposal is still in line in approach with the small battery charger standards, but has a little bit greater allowance in the maintenance mode and the 24-hour test, and since these products are always connected to the power supply, that they do not get tested for no battery mode.

I want to discuss the effective dates, so for small chargers, the current proposal is that the standards become effective July 1st, 2012; for large chargers, we're looking at July 1st, 2012, the same date for Tier 1, and a year later for Tier 2. We have proposed in the staff report a later date for replacement parts and repair parts, so that Manufacturers can continue to provide compatible parts for old products that they will not be able to address in redesign. And again, just to be clear, this is by date of manufacture, so when July 1st, 2012 comes, any products that are in stock prior to that may still be sold without many of the regulations. So it's not by the date of sale, but it's by the date of manufacture.

The staff report also proposes a few exceptions, the first is for medical devices that require FDA certification. Staff received several comments that this is a lengthy process and that it's a very special product type, so we've propose to exempt them, again, replacement parts would have a longer time to comply, and both of these exceptions are consistent with the way that external power supply regulations were approached. And, again, we're not talking about on-road vehicles, so the plug-in, hybrid, on-road vehicles made by big auto Manufacturers, we are not proposing any charger standards for those.

So, when it comes to enforcing this and gathering

information related to this standard, the staff report is proposing that we do this through labeling and not through a certification process. There are just such a large number of battery charger systems, and there are so many new ones each year, that certification is difficult from both the industry standpoint and from the Energy Commission standpoint, and we believe that labeling will reduce certification cost and time for, again, both Manufacturers and the Energy Commission. The proposal is that a marking of some type should be placed on the product. Right now, an S-II mark for small chargers, and an L-II mark for large chargers and, again, we really welcome any feedback on these markings. A big issue that has been brought up in the past is the label location. The battery charger test method identifies three product categories and we believe those three product categories are a good way to divide labeling locations, so, for some products, the battery is actually removed from the product and then placed in the charger, and for that type of product, we propose that the label go on the charger, or on the cradle. For products that incorporate the charge circuitry and the battery is held in that product during charging, we propose that the label go on the product, itself. So, for example, a laptop, the batteries are removed, the charging circuitry is inside the laptop, at least in many cases, so in that case it would go

on the laptop. If there is no charge circuitry or, for more simplistic chargers that use what we call a battery charging external power supply, then that label would go on the external charger. So, this would be the case that the product has a battery, doesn't contain any charging circuitry, the battery doesn't get removed from the product, but the charger circuitry is in an external box of some kind.

I wanted to address a few of the comments, and I think Mike has already made these points, stakeholders -- we've been looking for feedback for several years on battery charger standards, and we don't believe that the information that is used as a basis for these standards are flawed. In terms of transparency, we're always open to discussion. If industry has questions, those questions don't necessarily have to come in a letter form, and we'd be happy to work with you and sit down with you and discuss your issues.

So, to summarize the process that formed the staff report, we analyzed the case information, we analyzed the DOE information, and we analyzed the stakeholder comments, and the result of that analysis shows that what we're proposing in the staff report will save a significant amount of energy, are technically feasible, and that the standards would be cost-effective. And, again, the basis for these assumptions is available and the calculations are available

in Appendix B and in the online Excel model. And, oh, very important, written comments, I want to reiterate that most of this stuff is in the Notice for the Workshop, but please to be sure to include a hard copy with a digital copy if you are trying to docket your comments. We had a few issues with that in the past and I just want to reiterate that we need both the paper hard copy and a digital copy to docket.

And we can open it up for questions at this point. I'll start with people in the room and then move on to people on the phone line.

MR. LEAON: And, again, if you could fill out a blue card, thank you.

MR. SINGH: You know, I have received two questions from – this is Harinder Singh – Alan Mears and Dan Jakl. I think those two questions, we would like to respond to after Ecos' presentation because Ecos may be answering those questions, so if would be better to wait for that presentation to finish before we start responding to technical questions if there are any left out there. So, my request is that, after Ecos' presentation, we would respond to all the questions. So, please submit your questions or blue cards to us at this time, and we will respond to all those questions. Thank you.

MR. LEAON: All right, we have a couple other blue cards. The first is from Rick Habben with Wahl Clipper. I

hope I got your name right, Rick.

MR. HABBEN: Good afternoon. Yeah, I do have several comments regarding the presentation that was just presented. The first of the comments is regarding the usage factors. And I want to make sure that I do have my information correct. The usage factor that was used, and by the way, I want to specify that my comments today are mainly in respect to personal care appliances, I don't know the other categories that well, so my comments are mainly in response to those. In the usage factor in your case study, the personal care appliances, it was determined that they were left plugged in all the time. When I went back to look at what I call your source data on the document that was referenced, it was by Ecos, in there, there was one product that was listed in that category. Is that one product what the case study usage pattern was determined?

MR. RIDER: So – and I would really leave it to Ecos, but my understanding of it is that those graphs – let me see if I can pull back the graph – so there's some basic usage assumptions and then also the shape of these types occurs were used, as well, to determine not so much unplugged or plugged, but the difference in duty cycles between charge and maintenance mode powers. So, in figuring out charge and maintenance mode power, these graphs were used – no battery and unplugged assumptions are not really

based on – you can't measure that in a lab, that has to be an assumption on people's behavior, so I think that is just – so, yes, partially it is based on that test information, partially not based on that test information.

MR. HABBEN: Okay, we have two different things going, then, because our usage pattern is not what you would – you cannot roll that into what you are using for charge and maintenance. Usage pattern is a habit of how someone is using the particular product. So, in our research that we have, we did a survey of over 450 men in California, a little less than half those men had beard trimmers, and the percentage of people that left it plugged in all the time was approximately 15 percent. So, you know, with that type of data that we have done, you know, the usage and the calculation of your energy savings is going to be drastically off when you only have 15 percent of the people and we question whether the 15 percent actually, we feel it's actually a little bit less, but I could show you the actual survey and show you that in greater detail, but you know, your savings for that particular product category are going to be greatly skewed. The other question that I have is, in the case report regarding duty cycle, on page 40 – I'm sorry, at the top of page 9 in the case report, basically it states that, "In addition, staff have concluded that the duty cycles closely tied to consumer behavior are

likely to evolve with time, and that the standards based on the specific duty cycles are not appropriate." Could you explain that to me?

MR. RIDER: Yeah, so that's talking about the DOE approach, so the DOE approach, as Ric Erdheim mentioned, was that that causes eight product categories, or 10 product categories in the DOE rulemaking. The standards here are in no way tied to the duty cycles of the products; the savings are. The savings we calculate in the cost-effectiveness are tied to the duty cycle. But whether someone uses a shaver one way or another, the standard is indifferent to that. It says "you will use .5 watts in maintenance mode," no matter how much your product is in maintenance mode. And given the duty cycle assumption, we did look at duty cycles of each product, and even with something that seems like it should vary, or maybe could vary by duty cycle, we found that it was still cost-effective for all duty cycles that were – and for all products that were considered in this rulemaking. So, the issue with the DOE approach that we were trying to point out at that point was that, if you make a standard that is tied to duty cycle, and your product, the personal care product, gets lumped in with a cordless phone, which are very different usages, and we come up with an average duty cycle, then we won't be appropriately addressing your product or the cordless phone. And so we wanted to avoid a

standard approach that would do that, which would lump your product with inappropriate duty cycle, and make you design something that isn't appropriate to the way that your shaver is used.

MR. HABBEN: I guess, in doing that, what you're doing is your discounting any type of duty cycle whatsoever. So, instead of being a little bit off, you're completely off because you're not addressing duty cycle at all. So, there's a huge issue where, if a person isn't leaving the product plugged in, you can't attain anymore energy savings no matter what you do to the product. If it's not plugged in, it's not using any energy at all.

MR. RIDER: Right –

MR. HABBEN: So, if you don't accommodate any duty cycle, then you've really skewed your numbers if you have a product category such as ours, where the vast majority are unplugged.

MR. RIDER: Well, it's my understanding that, and maybe it's displayed in your own surveys, that people use your product differently, some use 15 percent – I think you said do leave them plugged in –

MR. HABBEN: Right.

MR. RIDER: -- and I guess the remainder, 85 percent don't. And so, because there's a huge variation in how these are used, no matter what you pick for an average duty

cycle, the way that – no assumption you're going to make for a duty cycle is going to work for everybody, and so that's a dangerous approach from a standards development process because you can't – everybody uses them differently, there's such a huge variation in how – you can come up with an average, but the distribution is wide, you've got people on the extreme that are leaving them plugged in, and people in the other extreme that are really good about unplugging them.

MR. HABBEN: So, the other issue, and you've already admitted this, that you did calculate the energy savings based on all products being plugged in all the time, correct?

MR. RIDER: No. Different duty cycles for different products.

MR. HABBEN: But for personal care, it was 100 percent.

MR. RIDER: It could be, yes, okay, if it's on that page, yes. Plugged in, but not necessarily with a battery put into it.

MR. HABBEN: All right, the next issue that I want to raise is regarding the cost of components. Since the majority of our units that we have only have one battery, in order to keep the costs down, our voltage is 1.2 volts because these products that I'm specifying are either a

Nickel Metal Hydride or a NiCad, so they would be approximately 1.35 volts fully charged and, as stated in our comments during the fall workshop, the control circuitry needs 1.8 volts minimum to function correctly. Your response was that the ICs do not run off the battery, which is true, but the chargers are still only putting out 1.5 volts to charge the batteries, which would power the ICs. Therefore, to put charge control in these units, we need to increase the voltage level over power adapters to control the circuitry, then reduce it to preferably charge the battery. And we believe that this is going in the wrong direction for energy savings to actually increase your charger to put your control circuitry in. We haven't, I guess, explored all potential options for control circuitry and maybe there is something else out there, but right now, my electrical engineers that I've been working with told me that the lowest that they can find for control circuitry is 1.8 volts.

MR. RIDER: Is this a question – to clarify your comment – so, the external power supply both charges the battery and runs the – the shaver, let's say –

MR. HABBEN: No, it doesn't. And I have both cases, I have units that will run the trimmer and charge the battery, and I have units that are rechargeable, only. What I'm specifically talking about right now, well, in our

particular case, it could be for both, but the one I was specifically mentioning is for recharging the unit only. And I actually have a sample that I can bring up and show you, you know, what's all in the smallness and the compactness of it, and that's another issue that I have, is that we don't have room in our products to add this circuitry that you're talking about, so that's where, again, in the fall meeting I was talking about, tool changes and mold designs to our products, to potentially include these type of controls. In addition, you know, one of your answers to my question regarding this was, you know, to add a current limiter in the active mode on off switch, you know, and as I just said, we just don't have room to add those particular components. And so that's going to be a very difficult issue for us.

MR. SINGH: I think Ecos is going to respond to your question on the molding part, or they have the tiered analyses of these personal care products, so we'll present that information and I think it will be good if you ask the question if you have other questions on that particular issue after the Ecos presentation. Thank you.

MR. RIDER: We're – I guess we're investigating those issues.

MR. HABBEN: So then, the third thing that I have here is that, you know, I disagree with the payback for your

customer. In your cost savings analysis, you use the raw material costs to calculate your customer payback. You cannot use this number as it does not take into account manufacturing overheads and retail mark-ups, as an approximate number to use is four times the raw materials cost for your end customer, therefore, if you use a more realistic number of raw material increase, which we're estimating, as I'm saying, we're still looking at it, but if you use the estimating number of $1.50 to $2.00 for incremental costs to bring these products into compliance, you're looking at a $6.00 to $8.00 increase to your customer at the retail. And in today's struggling economy, your customers do not need this unnecessary cost increase. In addition, with these realistic numbers, you know, as I just said, there's no payback for the customer over the life of the product, and if you look in your proposal on page 11, you guys were using a cost improvement incremental cost of $.30, and then you said the average savings per year was $.78. This, again, is for small battery chargers. So, over the lifecycle of 3.3 years, you guys were giving a cost benefit of $2.27. And what I'm saying is that I'm going to start out with probably $1.50 to $2.00 incremental increase, and then your customer is going to be paying four times that amount, which is $6.00 to $8.00 increase, so your payback is no longer – you're in the hole by over $4.00 to $6.00.

MR. RIDER: Um, yeah, well, we'd like to see the assumptions going into this $1.50-$2.00 cost, and for the four times mark-up, I don't think we've received any basis for – I mean, we've looked at the mark-ups in the DOE analysis, we've talked to Ecos about mark-ups in their analysis, and you bring up a third source of mark-ups and costs, and we would love to see what the assumptions are behind that.

MR. HABBEN: I guess, and then the fourth point, because of the issues I've just raised, you know, it seems to me that this proposal, when you dive into this and you look more closely at the data, you'll see that this does no longer meet the requirements of the Warren-Alquist Act, you know, it is not going to be cost-effective, and that is one of the requirements of the Act. The final point that I have at this point, you know, if you do regulate the product that is going to be regulated by the DOE, the time in which compliance is required is way too short. I have – at present time, I have 16 separate models that would need implemented design changes in order to comply with the proposed regulations. I have six models which already comply with existing regulation, so I'm not saying it's not technically feasible, I'm just saying I have a lot of other models and different price points and price categories that do not comply. And to give you an example, the ones that do

comply sell for approximately $40.00 at retail. The ones that don't comply sell for $17.00 to $24.00 retail. And there's a reason the ones that do comply now obviously had more control circuitry in them, and they are more expensive. So, you know, in the case report, even in your own case report, it was recommended that a two-year timeframe to give Manufacturers to comply, and that was in your own case report, now you're coming out and saying that you want to have this implemented and, basically, if I take from today's date, approximately a year and four months, that is way too short for us to try and make design changes on 16 different models. So, I have additional comments, but I'll save the rest for later.

MR. RIDER: Thank you.

MR. LEAON: Thank you, Rick. Okay, our next blue card is from Larry Albert, Power Tool Institute.

MR. ALBERT: Thank you, again. A couple things I want to point out that sort of follow on to the previous discussion with respect to the importance of including duty cycles in the standard level, and I understand what your comment was about the variability of duty cycles. It's been PTI's long position with respect to regulations regarding battery charger energy efficiency that we are supportive of these efforts, providing that the standard is structured in such a way that it provides meaningful benefit to the

consumers, and also that manufacturers will have flexibility in achieving a value of comprehensive energy efficiency. And to that end is why we supported the combination of having a comprehensive standard that relates all different modes of operations together under one metric, and in that calculation, of course, you have to include duty cycle. By discounting the duty cycle on the basis of this variability, which we recognize as one of the shortcomings of the approach, right? Then what happens is you also at the same time eliminate the fact that the metric is being used represents a comprehensive value of energy usage, and therefore you can't really ever relate the value of the standard back to comprehensive energy savings. You, yourself, that is, the Commission staff, right, have to use duty cycle assumptions in calculating the overall benefit to the State of California, like with those same assumptions not being used in terms of providing a calculation for the standard, that is, a comprehensive metric. The biggest issue here in not using duty cycles, at least philosophically, is that the numbers you come up with for the metrics that you have are unrelated to each other, and one does not play off the other, it creates a problem where manufacturers, in having to achieve each of the metrics individually, may not be providing the maximum amount of energy savings benefit to the consumer at the lowest

possible cost. In providing a comprehensive metric, then you afford manufacturers the ability to use their design resources effectively and being able to meet the requirement, and at the same time provide the lowest possible cost increase to consumers, and therefore maintaining the best value with respect to energy savings, and that's the real issue with respect to duty cycle, all right, just so we understand where we were coming from all these years. In addition, and I'd like to comment on a few other items that came up here, your discussion about the source of data that was used by DOE and their reliance upon Navigant Consulting. Understand, you know, with respect to two sensitive issues here, with respect to cost to the consumer as a result of implementing any sort of energy efficiency standard, right, and also with respect to the duty cycle, certainly the duty cycle is perhaps less of an issue, but certainly issues with respect to consumer costs, are related back to producer costs. And producer cost is a very sensitive subject that Manufacturers certainly do not want to share with public agencies, right, do not want to share with each other. And do the approach that I think was offered, that DOE uses, is they use a consultant, right, that gleans that information from a variety of different Manufacturers as a way of ensuring that they get valid information, and then they combine that information together

and provide that to DOE so that individual producer information, then, does not become a part of the public record. And I think comments back from AHAM, and certainly most recently, and I apologize for the lateness of them from PTI, offer to provide that information through our respective trade associations as a way of de-identifying information from individual Manufacturers and providing it in a way that at least is validated with respect to the source as something that Commission staff could use. To follow along with Rick's earlier comment, it's important to recognize that the actual cost to consumers are dependent upon not only the individual component increases associated with compliance with a standard, but also the manufacturing costs associated with that, all of the producer mark-ups in the supply chain, the realities of dealing with a limited set of retailers out there, the impact that has, and also to perhaps a certain extent upon the effective cost -- or price elasticity in the marketplace. So, all of those things were part of a very detailed investigation that was done by DOE consultants, right, and I don't think was necessarily replicated by Commission staff or their consultants in the preparation of the report. And, again, with respect to the question of cost again in terms of achieving certain technical solutions, questioning to what extent that was validated through manufacturers or through the process of

evaluating the practicality of the solutions, certainly if you're looking at this in sort of an abstract sense, and you don't actually have any practical design or manufacturing experience, certain solutions may seem to be pretty achievable. In actual fact, those solutions may not be nearly as achievable, they may not be practical, they may not be feasible technically, and they also may be more costly than you anticipated they would be because of these elements that come into play. And tied into that, there is a questions as to whether the costs that were associated with achieving the compliance with the standard took into account both the compliance with the efficiency parts of the standard and the power factor of the parts of the standard at the same time, that is, trying to achieve a certain efficiency at point in our power factor, was that something that you considered in considering what the cost mark-up was?

MR. RIDER: Okay, well, you've got a lot of points here, I'm going to try to hit on them as best as I can, or respond to them, rather. I guess, going back to the statements about – I guess, if I understand correctly, you were discussing the flexibility that a comprehensive annual energy consumption approach provides manufacturers so that they can best ensure that consumers get benefit. One of the bases – one of the reasons we chose to do this individual

metric approach is that, no matter how a consumer is using their product, they will see energy savings because – unless they never use the product – because we're asking for improvements in charge mode and maintenance mode and no battery mode, you're ensured to get savings, whereas if you – and we are ensured to get statewide savings so long as products are used. Now, if you take a comprehensive approach, then it could be that the duty cycle associated with the product, especially if it's not representative or if behavior changes over time, then your standard may not actually result in any savings in a statewide sense because, if people don't use it the way you assumed, then let's say it really heavily favors maintenance mode, and nobody ever leaves their battery chargers in maintenance mode, then you haven't actually achieved any statewide savings and it's a converse issue and there are tradeoffs there, but that's one of the counter tradeoffs I wanted to bring up.

MR. ALBERT: Could I just follow-up on that one point?

MR. RIDER: Sure.

MR. ALBERT: The issue here is not necessarily whether you're going to save energy or not by implementing across the board improvements in all the metrics, right? I think that's obvious, right? The issue here is whether it's cost-effective to the consumer to do that. If you mandate a

requirement in a metric that's not actually used by the consumer, and there is a cost, an incremental cost associated with complying with just that metric, alone, then that consumer is burdened with the cost of the compliance with that metric without seeing a commensurate benefit in energy savings. And that's really what the issue is. By providing a comprehensive model, in that way, all things are weighted in what is believed to be an appropriate manner, right, such that when cost is applied, it's applied in a manner that's reflective of the anticipated energy use, and therefore is going to yield the largest energy savings per dollar to the consumer of incremental cost. That's really what it's above. I can't dispute what you said about if you make everything zero, you're going to save money, right? But it's hard to argue with, right -- you're going to save energy, rather, right? What you are going to do is unfairly burden the consumer with a lot of cost that isn't necessarily realizable in their energy savings.

MR. RIDER: And a best attempt at characterizing whether that would happen, we made an attempt to characterize whether that would happen and that is in Appendix B where we calculate the energy savings on various duty cycles of just a flat, across-the-board standard. And so, in this analysis, and you can point out where it's flawed, and many of you brought up good points on that, at

least the way it's set up now, these metrics applied across the board seem to be cost-effective on an assumed average duty cycle. So, I think we've at least in the staff report, if the numbers are correct, we've kind of established that it's going to have benefit, whatever kind of product that is being covered.

MR. ALBERT: Again, it depends upon your assumptions about the cost of compliance.

MR. RIDER: Right. And we are, of course, open to reviewing those. So, the next point is looking into the Navigant and the industry data. One of the issues, especially looking at cost, is that the – well, they did release the manufacturer interview questions, and in several of the places, they asked what the costs were at levels that were not close to the CEC level, or that were not even the same as their proposed CSO levels, and so there's a great deal of extrapolation where they've gone away, at least it appears that they've gone and extrapolated quite a bit from where they actually sat down and spoke to manufacturers, so that's another reason why we sort of stepped back from those Manufacturer interview costs, because they are actually not the Manufacturer interview costs, they are extrapolated costs.

MR. ALBERT: And your validation method was what?

MR. RIDER: Our validation method? It is based on –

so there was a second approach for the DOE, which was not the – and I wanted to bring this up to you, which was not the Manufacturer interview, they hired iSuppli, and iSuppli did tear-downs of these products and found very different costs, costs that are similar, and I believe Ecos will present an updated approach to their costs that I think we see kind of a converging process there, and they do have expertise in manufacturing and they are, I believe, an appropriate third-party entity to evaluate those costs, and those costs are significantly lower than the DOE and the Manufacturer interview costs. And so – and they're designed, and it's evaluating designs like the switch concept, they discuss the design, they discuss why they think that these chargers have met the standard, and that's also another way that we validated these approaches, and unless they're missing unforeseen costs, which you bring out, there could be, depending on the design, unforeseen costs that, because we're not experts, we don't build battery chargers at the Energy Commission, but we believe that their iSuppli teardowns have done a fairly good job of looking at those and that Ecos' analysis also took a look at those, and we've been in contact with them about their assumptions, but we're also looking for assumptions and feedback from industry on these. So, that, I wanted to give a response to the costs and how we went about coming to the

fact that Ecos' information is good, and why we didn't take the suggestion to take the DOE information, DOE costs.

MR. ALBERT: Would commission staff be interested in getting aggregated data from industry and discussing what format that data should be in, and what kind of thresholds to be looking at for compliance?

MR. RIDER: I think, from an industry perspective, you're looking at what points are really important to make in terms of cost, I wouldn't flood us with a cost for every product, especially if they're compliant, or they're reasonably low anyways, I would focus on the problem areas where there's a serious issue with cost and based on the assumptions in our approach, and then, once you've identified those, we can talk and discuss the best way to get that information.

MR. ALBERT: So our proposal was to discuss with you the format of the information and the kinds of information you were specifically interested in, and that the trade association would then aggregate information, provide it to CEC staff. I guess this process has been done in the past with some success, right, and then that information would then provide you some validation from a stakeholder, from Manufacturers' perspective, right, that you could then use to evaluate the accuracy of the information you were using in your analysis.

MR. RIDER: I think that's the road we were trying to go down with the Request for Information from industry.

MR. ALBERT: Right, but we're suggesting that goes through a trade association so that individual Manufacturers are protected against providing this, the sensitive information to a public agency.

MR. RIDER: However stakeholders are most comfortable with doing it.

MR. ALBERT: Okay.

MR. LEAON: We'll definitely look at that information.

MR. ALBERT: Okay, so a couple – sorry to take so much time here, but you had a long presentation and I had a whole bunch of comments here. So, your discussion about the switch here, and I was glad to see that you clarified some items about that it's not zero power being delivered to the battery, it's some lower value that provides now maybe a more suitable maintenance power to the battery. It still gets back, however, to the question of whether it should be a constant or a variable amount as a function of the battery power. I'm glad to see that you also have something in the works that's trying to address that. I would still comment on two key issues here, I think one of which is that, when you superimpose that new limit line on your dataset, you still have very little data points that comply, right? And

so if you're trying to make the case for feasibility based upon number of units, particularly in that sort of mid-power range of the 50 watts, or 100-watt range, or something like that, right, which represents unfortunately a lot of power tool battery chargers, right? Then, you know, it's hard to make that case because, even with the limit drawn there, then it becomes difficult to justify the feasibility issue. I would suggest if you're going to go that route that you revisit that and make sure that you can at least find that there are cases that comply, and there is a clear pathway to compliance, right, because right now you couldn't make that case based upon your data, right? Secondly, again, your analysis of the power usage and so on is based on 24 hours; again, the argument would be, if you're in maintenance 24 hours a day, then you're not ever active, right, and so, again, it's the issue back to the comprehensive nature of how you evaluate these things, so you can't really talk about 24 hours of maintenance power, seven days a week, you know, 52 weeks a year –

MR. RIDER: Are you talking about the testing or the duty cycle?

MR. ALBERT: Your calculation for – your basis for achieving the value –

MR. RIDER: Well, for the uninterruptable power supply, which would be really the case where it's all

maintenance, I think our duty cycles assume zero percent charge duty cycle to find if it's cost-effective or not. So, in the duty cycle, we are saying – if that's what you're talking about with the 100 percent maintenance.

MR. ALBERT: No, I was talking about in your calculation of how you achieve what that limit line should be, you used the 60 percent charge efficiency – where was that -- .5 watts, 60 percent charge efficiency –

MR. RIDER: Yeah.

MR. ALBERT: Right?

MR. RIDER: Uh huh.

MR. ALBERT: So 24 hours at 60 percent charge efficiency, right? But 24 hours at 60 percent charge efficiency assumes it's in maintenance 24 hours, right?

MR. RIDER: So, actually, no, that's not what's going on with the 24 hours. The 24 hours is incorporated to pull back from a three percent loss per day, so it's taking the day out of that, you've got three percent watt hours lost per day, so to get that data out of there, because we're talking about power, so in order to get that from that energy level, this is how much energy your battery is going to leak per day, which is that three percent assumption, you have to divide it by 24 hours. So, just to clarify, that's where the 24 hours is coming from, to get it back to power from energy metric.

MR. ALBERT: Okay, right. And then, lastly, if we could talk about power factor here.

MR. RIDER: Okay.

MR. ALBERT: So, there were two comments here in both the case report and the staff report, the threshold is based upon current, right? And in your slide there, I think you said it was based upon power. Are you changing how you determine what the threshold is?

MR. RIDER: I think the current proposal in the staff report is related to amps, but we know that if you draw one amp for one second, then you really haven't – why would you need power – if you just touch that one amp level, or whatever, or if you take the average, we're trying to make sure that we – that the product is something that would draw one amp on an ongoing basis, because that's what the savings are tied to is the amount of current that the product is drawing. So you could get to that by wattage because wattage is – I mean the amps on the input power are related to 115 volts, that it's kind of set. So, we could go with the watt approach, too, perhaps, but we're looking for feedback, we would appreciate feedback on, like I mentioned, on what the appropriate level might be for that.

MR. ALBERT: You know, I think we provided feedback with respect to this threshold, indirectly perhaps, inasmuch as we say that using the input current that you might be

measuring during active mode to evaluate the total losses in the system over its entire lifespan, right, is not appropriate because active mode represents a small percentage of time, right, where you have the high currents, and therefore the presumed effect of the low power factor, right? During maintenance mode and off mode, obviously, these input currents are much lower and so, therefore, any presumed power factor losses in the distributing wiring are less.

MR. RIDER: Right, and I leave it – it's based on the appendices of the case report. I can't recall right now the exact details of how they applied duty cycles, how many hours would they assume that this product would be in charge mode, but that assumption is out there, it's in the case report, and the details on that are in the case report.

MR. ALBERT: Right, and also in the case report, there's – not the case report, but the staff report, there is a discussion of methodologies to achieve these improvements in power factor. I would argue with you that, to achieve .9 power factor for these cases where you're over an amp, or whatever it happens to be, from many switch mode power supplies, right, which is what we're talking about here, right, for these sort of mid ranges, it's going to require something more than just passive methodology – active methodology and passive methodology, for that matter,

both have losses, significant losses, associated with them inside the product, and that those losses associated with those solutions would far exceed any benefit of the power savings that you're going to achieve in distribution wiring, incremental power savings in distributional wiring, due to the power factor improvement, all right? So, I don't know, when you went through this whole calculation, did you consider that? And did you specifically consider the cost of compliance with higher power factor, right? Along with everything else, right? Did you incrementally justify the requirement of having to meet a power factor metric in terms of its incremental savings to the consumer, you know, based upon the incremental cost to the consumer of the improvement. Did you individually justify that? Or, when you did the cost analysis, did you include the cost of power factor improvement in the overall cost of compliance with the standard?

MR. RIDER: I think the way that it was approached was that, well, first of all, passive power factor correction, I think there's this one amp line and that, below that line, we're talking about that's where the passive power factor comes into play, and that's achieving a .55 level. And I think that's what we meant to tell you with the passive power factor correction. Okay, and then the .9, the costs we're assuming active power factor

correction, and that was done on a basis of – I think the basis was looking at the cost of active power factor correction chip, the minimum amperage required, or that amperage line so the worst case is one amp, anything more, you save additional – it becomes more cost-effective, and that's how the analysis was conducted. Again, I don't know what the efficiency – how the efficiency hit was incorporated. Power factor was done on its own analysis. I would be interested to see what your estimate of that would be.

MR. ALBERT: Were you able, then, to validate that there was consumer cost benefit to just doing the power factor, alone?

MR. RIDER: I'm saying I would be looking forward to seeing what your estimate of the energy losses are on that and comparing that to the savings and the incremental costs that are assumed.

MR. ALBERT: Okay, to be clear, in the energy efficiency cost benefit analysis, right, power factor was not included in there on the cost side.

MR. RIDER: Well, what it is, the costs include – the estimated costs are making a compliant battery charger, so your battery charger is going to have to meet the efficiency requirements, so the savings are fixed, you're going to get these savings, power factor or not, because

you're going to have to meet the metric. If the power factor worsens your efficiency, you're going to have to do something to counter that in order to meet the standard. Whether that incremental cost of – I think the incremental cost is covered in the approaches that we've discussed here because we're not talking about, you know, most of these approaches take you beyond, like the example of the switch, taking you beyond the standard, and I think we're being conservative, we're trying to be conservative with our approaching, saying, you know, most of these approaches are beyond this line, this line is a loose line that, at best, requires 60 percent efficiencies over the 24-hour period, and that that small difference wouldn't result in a significant change to the incremental cost estimate. But, again, if you have feedback that says otherwise, I mean, I'd be glad to –

MR. ALBERT: I'm just trying to find out the basis of –

MR. LEAON: Larry, if I can interject here, it's 1:15 now and we've got a lot of material to get through in the Ecos presentation, as well, and we still haven't taken a break for lunch, so could you save your questions – well, let me first ask the folks, do we want to take a break at this point for lunch? Yes, okay. Does anybody have any time constraints regarding flights? Four o'clock, okay.

Well, it's 1:15, so Rick, you need to probably leave, what, by 3:00? Oh, you have to leave here by 4:00, okay. Okay, all right, thank you. So why don't we take a 45-minute lunch and let's convene back here at 2:00 sharp, and –

MR. ALBERT: Just the answer to this one question. Has the cost of power factor been included in your cost estimates for the cost benefit analysis?

MR. RIDER: The cost of the power improvement has been, but not necessarily – I don't know that the relationship between the two, how intricate, I don't recall the intricacies between that relationship. So, power factor by itself, yes, standard by itself/relationship, I don't know.

MR. ALBERT: Okay, thank you.

(Off the record at 1:15 p.m.)

(Reconvene at 2:05 p.m.)

MR. LEAON: Okay, let's reconvene. If everyone can get settled. Okay, let's go ahead and get started. We can take another five to 10 minutes for any additional questions on the staff report, but I would like to move onto the presentation from Ecos. As I said, they have quite a bit of information that we need to get through in their presentation, and I'm sure that's going to generate quite a few questions. So, if we can limit additional questions to about 10 minutes, I would appreciate that. Thank you.

MR. ERDHEIM: Yes, Mike, and to speed this up, Ken and I have already exchanged questions and answers to most of this already, so let me just go through this very quickly, question 1 dealt with the labeling requirement where we would be – the proposal is we would label the products to certify we were in compliance with the California requirements, and my question is, well, underlying all of this discussion is that, at some point, California requirements are going to be preempted for consumer type of products, so what happens then? I think Ken's initial response was, well, you wouldn't be preempted – the preemption wouldn't apply to labeling, and then I said, "Well, we would then be labeling to certify to a non-standard," and then I think Ken said, "Well, that's a good point," and that's kind of where we left it off. So just a question, knowing that there's going to be preemption, how does the labeling work? Does it make sense to establish a labeling program for products for which the program is going to be eliminated soon? We can leave that up to your opinion, so –

MR. RIDER: And I want to clarify one thing and it wasn't – in the preliminary DOE analysis, they don't address – at least I didn't see their enforcement policy for battery chargers, so just to be 100 percent clear, if they did do a label, if they do implement labeling as their enforcement

method, we would be preempted from our own label. So, I was only thinking if they required certification, we would not be preempted.

MR. ERDHEIM: They have a separate – and, again, I'm not an expert on this – but they've just come out with a rulemaking that applies to certification for all of their requirements, so they're focused on certification as opposed to the labeling.

MR. RIDER: But I believe for external power supplies, and maybe you can speak to this because I know you guys probably certify some of them, do they require certification for those products?

MR. ERDHEIM: I believe so.

MR. RIDER: Okay.

MR. ERDHEIM: I believe so. This is a generic requirement that applies to all of the DOE regulations, but I believe there is a protocol now that each company has to comply with to certify. So, I don't need an answer right now, but the point is that labeling a product for maybe a year, and then going out of effect, unless the DOE does its own label, doesn't seem to make a lot of sense. So the second point, which I also talked to Ken about was the effective date. So, Ken made the point that the effective date applies to the date of manufacture, so presumably there would be products manufactured before the effective date

that would be sold during the year. Let's just for the sake of argument assume that you go ahead with this process and there's a one-year time period between when your date is effected and the Department of Energy rules come into effect and, then, you're preempted, so, in calculating the energy savings for that year, did you assume a whole year's worth of compliant products?

MR. RIDER: Yes, so it's one year of compliant product sales, so presumably July 1, 2012 rolls around -- let's talk about small chargers -– the first day, we're not saving anything, are we, one day's worth of sales, right? And then, so the one-year figure is – the rate at which we would be saving energy at July 1st, 2013, and at which point DOE wouldn't have saved any energy with their point, but we would have made one year of sales.

MR. ERDHEIM: Well, you would have had one year of sales, but let's say that it takes four months for product to be manufactured, so it's manufactured overseas, transported to the United States through the company's distribution system and to the retailers' distribution system, and the consumer buys it, pick a day, let's say it's four months, so are you calculating for that year a year's worth of savings, or eight months' worth of savings?

MR. RIDER: So you're talking about the delay in the manufacture cycle, the sales?

MR. ERDHEIM: Yeah.

MR. RIDER: I guess I – whether that assumption makes sense or not is whether the Manufacturer would – how the Manufacturer would treat it. If they made a year full of sales, assuming that the California Standard, or the DOE standard was similar, then eventually those sales that were back four months would make it through the pipeline and to the sales floor, so it depends on how the Manufacturer approaches the standard. So, it could be that it's eight months, it could be that it's a year, we're assuming a year.

MR. ERDHEIM: Okay, thanks.

MR. LEAON: Okay, any other questions for Ken? Do we want to take a quick question from the phone? Oh, a comment for the staff report? I think what we would like to do if you don't mind, I really want to get Ecos' presentation, unless it relates directly to something with the staff report, but I think most of these issues are going to also be covered through Ecos. Okay, since we haven't asked anybody on the phone for questions, let's take one question from the phone on the staff report.

MR. RIDER: All right, it's going to be chaos. All right, I'll open up the line. If anyone on the phone has a question, go ahead. I see Teresa Jordan has raised –

MS. JORDAN: Yeah, hi. This is Teresa Jordan from Motorola Solutions, Inc.

MR. RIDER: Hi.

MS. JORDAN: Hopefully you can hear me.

MR. RIDER: Yes.

MS. JORDAN: I would reiterate the request that anybody who is on the phone who doesn't have their line on mute, please mute your line. Okay, thanks. My question is, I really would like a clarification of one of the statements that is in the staff report, and I just want to make sure that we're understanding it correctly. So, on page 16, there's a statement that says that "the proposed regulations can be met by replacing the charged current controller and the battery charger circuitry with a comparator, and a transistor uses an on/off switch." So what I would like to know is, is it actually the CEC's contention that all battery charging products can meet the regulation using this approach?

MR. RIDER: I don't know who that other person is, but to answer your question, I don't think that is necessarily – and I tried to reiterate that in the conversation of approaches that that is not the only way that you could meet the regulation, and that it may not be the right way for the Manufacturer to do it, we leave that up to the Manufacturer to decide the best approach, just that this is one really simply approach that certainly, no matter how you manufacture – or how the battery is

operating, will save energy.

MS. JORDAN: Okay, there's actually somebody on the phone who seems to be having another conversation – okay, good.

MR. RIDER: Yeah, I don't think he's on the line anymore. So, did that answer your question.

MS. JORDAN: Well, yeah, but then the follow-on question is, then, but that seems to be the approach that is used in the calculation of the cost benefit analysis. Is that perception accurate?

MR. RIDER: That's one of the approaches. We tried to characterize as many approaches as possible in the staff report, in the technical feasibility section, and, in addition, the case report also characterizes them and their assumed costs. As you note, the costs are different for different product classes, so obviously there are a little bit different assumptions about what the cost will be for different battery capacities and some consideration of different products, so, yeah, I think we have considered the cost of different approaches and this is just one that saves energy across many project classes, so it's an easy talking point, easy concept to demonstrate. A lot of the other approaches are really technically dense and harder to explain; I think this one is the easiest one to explain, so that's why we brought it up in the workshop.

MS. JORDAN: Yeah, I would agree, a lot of the other strategies are definitely technically dense.

MR. RIDER: Right.

MS. JORDAN: But that's why, you know, in reading through the staff report, I was looking at the comments that the agency responded to, and it seems as though every time a stakeholder mentioned a concern, saying, "Well, we're going to have to do a redesign because we have to do something that's more technically complicated than just adding a switch, and it's going to add extra costs, and it's going to add extra time," the response from the agency was, "Well, no, you don't have to do that, you can just add a comparator and a transistor." So that was like comment 3, number 4, number 6, number 9, number 11, number 12, they are all along those same lines, so it seems as though the CEC is asserting over and over that that is really a solution that's going to work in every case and get you to the performance level that you need. But, for instance, with our products, we already use that approach in our product design, and right now we don't have any battery charging systems that will meet the proposed energy efficiency level. So, I'm just wondering, what is the perception at the agency about, you know, what products are already used in this approach? Because it seems like the perception is that the percentage of products used in this approach is really low.

MR. RIDER: And I think we're addressing the cheapest – the switch approach is to address the kind of cheapest product design on the market, which is why the graph shows, you know, just a resistor circuit, that's really the point – the point, why we bring that up again and again in the staff report, is that we want to look at the – we want to make sure we're talking about the cheapest approach that maintains product efficacy, and a lot of the comment we got, or information that has been provided to us, are kind of more extravagant approaches, that go way beyond what is necessary to meet the standards. And so we want to avoid that while looking at the approaches and coming up with the correct costs. So, I think in my slide on the large battery chargers, I pointed out that there are some cases where you need to do more than just stampede them at the switch.

MS. JORDAN: Right, but the way that the products are categorized by California, our products, even though they're industrial, are still considered small and not large, and to us it seems like, you know, there's a real dichotomy there between the consumer products and the non-consumer products that really should be addressed by different standards because, you know, our products have to be a lot more ruggedized, they have to operate in really extreme conditions as far as temperature goes, and so the

cheapest approach really isn't going to work for our type of products. It might work for a product that doesn't get as heavy of use, but you know, that's not really anywhere in the report, they're all lumped together, and I'm wondering what the justification is, you know, for not recognizing the performance differences that are necessary for consumer and non-consumer products.

MR. RIDER: Okay, I recognize that there's a difference there. I think I just want to reiterate, that's the easiest one to explain in a public meeting is this one, and I think we did look at other approaches, the efficiency. And we would like to see in comment, you know, your approaches to cost and your difficulties with organization, or whatever other concerns you may have.

MS. JORDAN: Okay. Yeah, we would definitely like to give you whatever information you need, but we're wondering what kind of data you want because, you know, we did provide a whole bunch of data to you, or general information to you guys in our previous meeting, which didn't seem to be incorporated at all into the staff report, so can you give us an idea when you say you want some more data of exactly what you're looking for, that would be the most useful thing for you guys?

MR. RIDER: Sure, and I think to expedite conversation, maybe we could just have a conversation with

you offline, out of this workshop to discuss that.

MS. JORDAN: Okay. All right, thank you.

MR. RIDER: Okay, no problem.

MR. PRICE: Good afternoon, this is Jeff Price.

MR. RIDER: Jeff Price? Yeah, I see your hand is raised. Do we have time, Mike?

MR. PRICE: I'll lower my hand now. I have a couple of specific questions. For starters, I'm a proponent of helping educate you guys to learn more about fundamental requirements for [inaudible] [00:15:01], but I am trying to work my way through this and rationalize the benefits always with reducing power. My concerns, I guess, are pointed towards the existing Title 20 requirements for the –

MR. RIDER: Jeff, can you hold on one second? I'm having trouble hearing you. I'm going to mute everyone and make sure you're the only one talking. Okay, go ahead, continue.

MR. PRICE: All right. I have some specific questions related to the existing Title 20 document, which does regulate and allow for certification for exit sign products sold in the State of California.

MR. RIDER: Okay.

MR. PRICE: Is this proposal required to displace the existing requirements for exit signs found in Title 20? Or is this going to be in addition to?

MR. RIDER: I think the approach is that it's in addition to, you have a lighting standard for, and I believe it's each face of the exit sign, which is our current federal standard. We cannot supplant that standard. I think our opinion is that the battery charger is not covered by that standard and, so, I would say that the approach that we're looking at here would be on top of the current – existing requirements for exit signs.

MR. PRICE: Okay, because you guys do have restrictive power requirements for the entire sign which includes the normally on illumination of the internally illuminated sign, in addition to any power consumed by the charging circuit. So, if we're going to have that requirement and then you're going to dissect it further and look specifically into the charging mechanism?

MR. RIDER: Well, Jeff, I think the idea, what we would like to do in an ideal world is try to separate the lighting consumption from the battery charger consumption. The whole point of this rulemaking is to address battery chargers. One of the difficulties that Ecos has brought in their case report on the IOUs is that it doesn't seem possible to separate, or disconnect, or – the test method say to turn off everything that does not have to do with battery charging, but for the exit signs, it seems that there's just no feasible way of doing that, is my

understanding. And so, ideally, we would like to not include the lighting on the exit sign and, so, the solution is to come up with a less stringent approach.

MR. PRICE: Yeah, and again, I credit you guys for looking at efficiencies everywhere you can, but for a product that is federally mandated to be illuminated at all times, to disregard the energy consumption of the product in its normal operating state when 99.9 percent of its life is at a float voltage condition, anyway, seems – I'm trying to make sense of all of that. A question regarding the current language in the existing Title 20, it specifically states "emergency lighting," which is illuminated exit signs, is similar language going to be placed into this proposal, as well?

MR. RIDER: Are you talking about the existing standard?

MR. PRICE: Yes.

MR. RIDER: So we're not going to amend any of that. Like I said, the new standards will be on top of those standards. Those standards – the Title 20 document includes Federal standards, we have both Federal and State standards in the Appliance Efficiency Regulations. Those are Federal, we will not be amending those Federal Regulations in any way, nor will we be allowed to, so, no –

MR. PRICE: Right. Yeah, I guess the concern come

into play that when you get into the characteristics of the re-charge and the idle maintenance charge conditions, though the product may or may not – I'm sorry I couldn't analyze it better for you, but there's just not enough detail in the expectations of the program yet to make a determination of whether or not it's going to meet UL 924 Standards, which is the standard for emergency lighting and power equipment that we are rigorously held to and, by the way, is synchronized with the NFPA 101 Life Safety Code, the National Electrical Code, the International Building Code, and International Fire Code. So, I mean, by tampering with that portion of a product that, in today' market, I can't think of a single product that draws more than five watts per sign, and to critically compromise the performance attributes that are harmonized across all these standards, I hope somebody is investigating what ramification might be taking place there.

MR. RIDER: Right, Jeff, and we would appreciate your feedback on whether this is going to jeopardize any of those, but at least from the Energy Commission's standpoint at this point in our analysis, and what we've looked at, we haven't seen anything that suggests a more efficient battery charger would jeopardize the safety of the products, so maybe this standard is too stringent and it may do that, but, you know, as I mentioned earlier, we're not necessarily – we rely on industry to kind of bring up those kinds of

points and justify them, and we're glad you're part of this process. Maybe you can identify some of that for us.

MR. PRICE: I would hope to think that we have enough time to ratify, you know, once these restrictions are made clear, we're certainly going to have to have time to modify and prove out whether or not we can still meet the performance standards that are in those requirements. But it kind of sounds like the pace at which this thing is moving may not lend itself to that, and then what happens?

MR. RIDER: Well, I think we've tested some units. I think we have some information and I don't think we're just going with no information for it. We have tested – I think we have test information for a lot of uninterruptible power supplies, so the real question would be what makes –

MR. PRICE: Uninterruptible power supplies –

MR. RIDER: -- well right, this is a similar concept, right?

MR. PRICE: -- are held to two different criteria.

MR. RIDER: Sure, but I mean in terms of efficiency, they're both maintenance mode intensive.

MR. PRICE: Well, I agree with that, but the charge rate, see, we're held to – has anybody applied this logic, or this reduction in energy sent to the battery against the requirements that are found in UL 924? That's where you're going to find the embedded performance requirements for

public safety that our products are held to, and that all of the other Life Safety Code and Building Code Standards are harmonized against.

MR. RIDER: Well, now you mentioned that UL 924, I think we will look to make sure that we're not – I mean, you bring it up, it's a good point, and we'll look into UL 924, and any other issues you bring forward in comment.

MR. PRICE: Okay, that's fine. But this is consistent with the – there's going to be no extraneous surprises, this is emergency lighting, which is illuminated exit signs? That is the extent of the scope?

MR. RIDER: Oh, for the exception, yes, that one exception standard only would apply to exit signs.

MR. PRICE: Okay. Okay, thank you very much.

MR. LEAON: Okay, I think we need to move on to the presentation from Ecos and if Suzanne can come on up and, Ken, if you can tee up the presentation for her?

MS. FOSTER-PORTER: My name is Suzanne Foster-Porter. I am a consultant to the IOU Statewide Team that focuses on mandatory energy efficiency standard for appliances. I'd like to also introduce, before I get started, my colleague, Phillip Walters.

MR. WALTERS: Good afternoon, everyone. Thank you for having us here. I'll introduce myself since I'm a new face to many of you. Prior to my joining Ecos, I've worked

in Manufacturing for about 30 years, manufacturing high temperature severe environment lightronic instrumentation operating on batteries and low power, low energy availability sources, primarily for underground oil and gas work, directional drilling, and things like that. And, again, thank you for having us here today.

MS. FOSTER-PORTER: This presentation has a number of background – quite a bit of background material at the beginning, targeted for participants of this workshop that have not been participating to date. Given the time constraint, I'm going to move a little more quickly through that background information, given the fact that I think many of you in the room have been here prior. If there are any objections to that, please feel free to raise your hand and I am happy to go through the material, I'm just trying to balance the time that we have available against. Harinder?

MR. SINGH: It's not posted, we can do it right now if you want to.

MS. FOSTER-PORTER: So, I don't see any objections to moving a little more quickly through the background materials, so I'm going to go ahead and do that to enable us to get to the new material that is targeted for today.

I would like to acknowledge the group of organizations that have contributed to the technical work

that forms the basis for this proposal, it include Pacific Gas & Electric, Supply Technology Services Group, the California Energy Commission's Public Energy Research Program, and Southern California Edison, and the Electric Power Research Institute. All of these, we had sourced our data very heavily for many of the organizations that have contributed to our findings, and I just want to acknowledge that this is not the work of Ecos or the IOU Statewide Team, alone.

As the Energy Commission pointed out a little earlier, the staff, there have been a number of activities going on in battery chargers since as early as 2002. The industrial work has been underway for even longer, since 1998. There are three jurisdictions within the United States or policymaking groups within the United States that are currently looking at battery charger systems. We've talked most about U.S. DOE today and the California Energy Commission, of course, but the Energy Star Program, EPA Energy Star Program, is also in the process of revising their specifications, so there are a number of activities going on right now that have been built on a lot of research that has been going on by the IOU technical team for just under a decade. The proposal that we've put forward in the case report is informed by more than 100 products and we've performed multiple tasks of some of these products for both

large and small. In addition to the technical research and the specific workshops we've had on the test procedures, and the meetings we've had here at the Commission, we have made a lot of effort to reach out to Manufacturers in the last five of the eight years we presented this research out of one national battery conference that's hosted by the battery power magazine, we've written articles in the trade press for power electronics technology, calling for redesign of chargers and the upcoming standards that would affect the need to do that. In addition, we have a website on which we've posted all of this research and tried to make it as publicly available as possible.

The number of consumer chargers is continuing to increase. I think the DOE, EPA, and CEC have recognized the importance of looking at the energy use of battery charges, in part, for this reason. The battery charger standards apply to a wide range of battery sizes, chemistries, a wide range of product applications, they all perform the same fundamental function, which is to recharge a battery so that it can be disconnected from a wall outlet and operate as a alternate power source in the event of a power outage, or to operate a mobile product, either that's a product with wheels like a forklift, where you're driving a vehicle, or whether it's as small as a cell phone. They all have three important elements: you have to convert wall voltage to

direct current, you have to ensure that you're putting charge appropriately into the battery, as well as you have to have a battery that stores that energy.

The standard touches a wide variety of products. Some of these products, the absolute total energy that they present, is high because there's a large number of units in use; one example of this is the cordless phone. There are a high number of units in use and their annual energy use is relatively low compared to some other battery chargers, but their absolute consumption in the state is high. A three-phrased forklift has sort of the opposite situation where we don't have very many units in use, but the energy use is quite big per unit, so there are a number of major energy use contributors, the savings don't directly fall from the energy use, but they're closely related.

The Energy Commission led the way to creating external power supply standards that addressed multiple products, and this is a – it was the first sort of multi-product strategy to – I should say component strategy – to address plug load products. Battery chargers is the second sort of approach that helps to ensure that a number of plug load products are using less energy than before. Many of the products that are addressed by this standard would not make sense to us individually, but by improving this system that's associated with providing portable power, we can

improve the efficiency of a wide variety of products simultaneously, helping to meet the energy reduction goals in California.

There are a wide variety of form factors for battery chargers. The power supply, the charge control circuitry can be located in different housings, they may be separate from the battery, they may be contained with the battery, the standard is meant to address all of these. The form factor is, you know, how things are packaged is not necessarily a trend, does not trend with efficiency.

Battery chargers have three primary modes of operation which we've been talking about today, active, or charge mode, battery maintenance mode, where we ensure that the battery is topped off in counteracting self-discharge that occurs immediately after the charge cycle, and no battery mode, which is when that battery is disconnected from the charger. This is a drawing to represent the various modes, but does not necessarily characterize every battery charger, it's just an example. There are four dominant battery chemistries, they have different self-discharge rates, they have different over-charge tolerances, and so the charge control is treated differently for different chemistries. They also have different prices, which is why some chemistries tend to be incorporated in consumer products that are very sensitive to price point;

other chemistries like lithium ion is a more expensive one for consumer products, and tend to be incorporated in value add type products.

Efficiencies can vary widely, even within a similar product type with a similar – or I should say identical – battery chemistry. The charger on the left and the charger on the right are both lithium ion battery tool chargers. They have different 24-hour efficiencies, quite different, and different maintenance power, so we see variation even within one product type, and we see opportunities, cost-effective opportunities, to improve designs that are available on the market.

Product utility and consumer features don't correlate closely in the dataset, this is an example – the product on the left has a slow charge time and is less efficient, the product on the right has a faster charge time and higher efficiency, in part because, with the faster charge time, you need to do more sophisticated charge termination. There are also examples where the opposite of this is true, where we see high efficiency, slow chargers, and low efficiency fast chargers, so based on the data that we've collected, we don't see a strong trend in utility and consumer feature with efficiency. The standard, as you know, is broken up into two categories, small and large chargers. The small charger category includes both consumer

and non-consumer chargers, the large one is focused more on industrial mode of equipment. The rationale for making two different standards is because the markets for these products are significantly different and the technology is significantly different, they have different test procedures, as a result. Small chargers are typically sold with the battery, their usage patterns differ significantly. Price and portability drive this market. I want to mention here that golf carts is the one exception to this particular category, their trends are a little different. The case report moved to include them in the small charger category primarily to harmonize with DOE's approach to group them as a consumer product.

Large battery chargers are typically sold separately from their batteries, they are used more heavily, and because of their higher energy use, and because they're sold to more sophisticated buyers in the commercial and industrial sectors, lifecycle cost has already sort of been evaluated and there have been some movement in the market to higher efficiency. What this means is that the cost-effective savings as a percentage is lower than the small battery chargers, but there are still opportunities to improve power conversion efficiency and make more efficient some of the charge return factor, which is indicative of a charge behavior.

One of the questions that was raised in stakeholder comments at the October workshop was related to counteracting battery self-discharge. In the process of creating the standards, we looked carefully at self-discharge, knowing that many of the consumer products, even the most price sensitive consumer products do maintain full charge by trickle charging the battery, that's something that consumers would expect. In this table, we have identified the maximum battery since that we have observed in the market, and then to find the upper range of limit of what we have to supply for trickle charge, we modeled the AC power required to counteract self-discharge, taking into account the 24-hour self-discharge rates, which are higher than self-discharge rates after that 24-hour period, so you get the most self-discharge right after the product is charged, and that's just the nature of the chemistry of the batteries. In addition to modeling this, you can see that all the AC power is lower than the .5 watts that is required by the standard, so there is still some room for fixed losses that would occur in this mode, as well. In addition to doing a model, we also have developed two silicon charge prototypes, one for Nickel Metal Hydride, and one for NiCad. These are very early prototypes, but they demonstrate the feasibility associated, you know, not only in the model, but also in the laboratory, that it's possible to maintain

charge, as well as meet the proposed standard.

UNIDENTIFIED SPEAKER: [Inaudible] [00:38:00].

MS. FOSTER-PORTER: Sure. So the question for those on the phone was, “Can you please point out where those prototype values are shown on the graphic?” They’re the red values, one is approximately 20 watt hours and the other is a very low battery capacity product, just there around 2. Does that help? Okay.

An emerging product that we’ve seen just very recently that we didn’t address in the case report last October when it was produced are pad chargers. This is an emerging form factor that’s been for consumer products that enables the consumer to place a phone or another small electronic device directly on a pad without having to connect that device electrically with a wire. These photos are examples of early generations of these products. Right now, these products have an external harness, so the external harness plugs into the existing often USB connector on your phone, and then couples to the product. So, if you look on the far bottom left, that’s an example of one solution where the mechanism that enables it to communicate with the pad is on the back of that Blackberry phone, the other harness is shown in the far right photo, well, you can see there is the white square harness with the yellow wire, more sophisticated approach, is the one just below that, the

phone on the left that has the black ring around it, that looks like a rubberized ring, that's the harness for that particular product. Future solutions are likely to incorporate into the product. We recommend that these products be included in the Title 20 standard, they are battery chargers, and the form factor is slightly different than what we have seen, but our research suggests that they should be able to meet the standard.

In response to Manufacturer comments around mission critical battery charger systems, mission critical battery charger systems are carried by public emergency personnel, police officers, fire fighters, in order to communicate in sometimes hazardous situations. It's important that certain elements of the charger and functionality of the charger are maintained. Some of the concerns that were raised were related to rapid charging, we have tested multiple rapid chargers of similar battery size that are able to meet this proposed standard. The intrinsically safe circuitry that is required to prevent electrical spark generation should not significantly increase consumption for these products. It's important that these products have LED illumination to communicate the status of charge to the emergency personnel in a clear manner. These have to be quite bright in order to communicate in a variety of settings. Due to the advances of energy efficiency LEDs and the continuous

improvements that we have for efficacy on those devices, there are a number of very low wattage LEDs that are now available. The research that we conducted suggested that LED's, very high brightness LEDs, are available at 10-15 milliwatts per LED for six ports, which is a common configuration, that's between 6/100^{ths} and 3/10ths of a watt contributing to battery maintenance. In addition, it would be possible to incorporate the LCD display with variable backlight control that can respond to ambient room lighting, so when it is dark, the LCD display can be brightened. And because the efficiency test that is specified by the CEC and also by the U.S. DOE is conducted at normal room temperature, little to no energy associated with cooling fans or other things would switch on and then, therefore, the energy would be counted in the test.

In addition, to respond to Manufacturer comment, we had prepared in the case report some detailed cost information that indicated BOM cost per product category. At the request of manufacturers, we looked at this in great detail for two products, so we selected these products based on manufacturer input. The first product on the left is a do it yourself – I should say a home do it yourself tool, so it's sort of a price point, low price point entry product, for consumers. It's a 15 watt hour NiCad power tool charger. For the whole unit, it costs about $60.00 from

Home depot this February. The product on the right is a Nickel Metal Hydride beard trimmer, it's also an entry point product at $18.00 from Target in January of this year. And so I'm going to turn this over to my colleague, Phillip Walters, and he's going to walk us through the teardown analysis we conducted and the BOM estimates that we made for these two products.

MR. WALTERS: Excuse me a moment while I change to the right glasses. The first of the products that we looked at was the beard trimmer and, in doing teardown, we basically got an external power supply, which is the small kit to the left side of the trimmer in the photograph, and it plugs directly into the product for charging; inside the product, you've got the battery in series with the charge control resister. The chart here is showing the 24-hour charge profile, which is basically flat, and as you can see, at about four hours drops below half a watt. So the product, as shipped, is compliant with maintenance mode requirement of the proposed Title 20, and it is compliant with 24-hour efficiency, it is just slightly above the no battery requirement. And one of the things that I should mention, the external power supply on this product is Level 4 power supply, and we are as close as we are basically replacing the Level 4 with the Level 5 power supply, will bring us into compliance with the proposed Title 20

requirements. Based on information in the DOE technical support document, the incremental building material cost for this change is going to be around 10 cents to 15 cents using their mark-up; now, that gives us the benefit of cost ratio of 1:2. I should note that we're probably being pretty generous on how much cost we're attributing to this in that we get other benefits from that EPS, in addition to the compliance, so really only part of that would go to the compliance. These EPSs are available off the shelf from many third-party vendors already UL certified. One thing to consider further in the incremental cost of the Level 5 external power supply is an increasing trend on copper prices, level four supplies typically have quite a bit of mass that is copper, and the level five supply is being a switch mode supply, are going to be a lot less sensitive to the price of copper and so, as a result, there may even be with increasing copper costs a negative incremental cost in going from a level four to a level five external power supply.

When we looked at the power tool, we got again an external power supply that is charging the battery with resistor for charge control. Here, and again, we've got a pretty flat charge profile over 24 hours, and we can see that our as shipped efficiency, 24 hour efficiency, is around 35 percent and maintenance mode is around 2.2 watts.

No battery mode is compliant at 2.5. We, on this product, decided to evaluate a strategy of looking at the charge termination and charge control, and decided to pursue a silicon solution. There's a lot of products that are already using silicon control for lithium ion products and there are a lot of Manufacturer support. With semiconductors, they can perform the function of controlling the switch at a charge control available. You know, we've talked a lot today about comparators, there is a wide number of comparators and also comparators with onboard references. There are also a number of timers that are designed for charge control, there are more sophisticated charge control devices out there for applications where you've got a little more demanding performance requirements where the dT/dt is differential temperature vs. differential time, those usually also have a straight voltage comparator and timer as secondary controls. Then, you get into negative Delta V which is a technique for Nickel where, when the battery has achieved charge, there is a tendency, as you continue to feed charge for the voltage to decrease, and there's one sheet there shown as an example that couples that also with temperature and time control, as well. These are generally surfaced mount parts, they're very small. As you can see, the one that is right there by the word "one" is actually a control transistor that – and then the one that is over by

the word “dime” is a combination comparator, and voltage reference all on one chip. The circuit that we tried out and tested in this power tool product, it is – and I want to say, first off, we did not set out here to build the perfect battery charger, we’re just doing a circuit here just to evaluate what can be accomplished with the charge control switching from a charge mode to a maintenance mode, using a control IC and a transistor. This one is working as a comparator, we’ve replaced the original current or charge control resistor with the transistor, you’ll notice it does have in parallel with it right above the circle of the transistor, you’ll see a resistor there that is for maintaining a maintenance trickle charge when the transistor turns off. We could convert that circuit to a hysteresis charge circuit by removing that resistor, and what it would do would be turn off and, then, as the battery required maintenance, it would turn back on for a short interval. Looking at the parts that we used and looking at them in OEM quantity, the incremental BOM cost including incremental circuit board materials was about 55 cents. And when we put it under test, here we’re showing not only the input power in blue, but we’re showing the battery voltage in red. The 24-hour efficiency improved to 41 percent and maintenance e mode came in at .46 watts, which is compliant, and no battery was right at .3. We had some fixed loss from some

of the circuitry, particularly the comparator that I used because it was readily available to me. There are comparators that have as little as 100 nano amp power supply requirement that can improve on that number, and reduce that fixed loss. If we add a level V EPS, the previous slide was done with the existing EPS, which was level IV, we should be able to then meet the Title 20 standards and should bring the 24-hour efficiency to the 54 percent range, and maintenance at .4 watts, the battery still at .3. Incremental cost, again, bringing in the estimate for based on DOE, about 10 cents incremental cost, we looked at a total with markup using the DOE method of about $1.30, which gives us a payback of .6 year and 14 kilowatt per hour year annual savings. In this change, in this particular circuit, the charge cradle has a circuit board inside that actually has – it is considered to be part of the external power supply in the design in that the rectangle shown on the circuit board on the left-hand side is the full wave bridge rectifier. If we're using off-the-shelf Level V power supply, those would move off the board into the EPS. We're replacing the charge control resister with the silicon solution, and because of the availability of surface mount for both the transistor, the control, and the resistors and capacitors, we can easily fit the circuitry into the same printed circuit board form factor.

Another example of how you can implement silicon charge control in the same space, these are a look at the inside of two different trimmers that the upper one is using nickel metal hydride with the fairly typical resistor charge control element and the charge control and the battery are both mounted on the back side of a circuit board that accommodates the on/off switch. Lithium ion product in the same Manufacturer's line uses the same form factor circuit board where, again, we have the battery, the charge control, and the switch, all accommodated on the same circuit board. Now, these are lithium ion – this is a lithium ion product here with lithium ion control chips, but as far as the number and type of parts, in general, is very similar for both chemistries, and so it is possible to make the change and get it to still fit into the same space, and by keeping printer circuit board form factors the same, we can avoid having to do any tooling changes, model changes, and limit impact on our assembly documentation and things like that. The engineering that you get into on that, obviously, you're going to have to do the circuit design engineering upfront. Once you get into board layout, there are many many contract houses available worldwide for not only doing the layout work, but the assembly work, on surface mount. And I guess I kind of got a little bit ahead into this slide. You know, consumer products do have a regular redesign phrase, or

redesign cycle, and so working a circuit board change into the design cycle, or an external power supply change into the design cycle should be relatively easy. These are not huge redesign efforts. Changes like, say, the changes to product molding are not required if we can confine the change to the circuit board. Again, looking at the markup, it should be able to cover these costs. On the issue of safety testing, if we're – most of the – if we're using a UL certified external power supply, and we're staying within the parameters of what the battery manufacturers recommend, the feedback we have from UL is that it may not require any recertification, and if there is, when you're recertifying on that level of change in a product, the estimate we got from UL was $2,000 to $3,000. And I'm going to turn the presentation back over to Ms. Suzanne Porter.

MS. FOSTER-PORTER: I'm going to take the remaining part of the detailed presentation to focus on some issues that were raised by Manufacturers for the larger products, one of which is golf carts, which is covered by the small standard. There were concerns raised by Manufacturers that, by improving the efficiency and increasing the upfront cost associated with golf cart vehicles, that it would cause a technology transition to gasoline powered vehicles. Our research suggests this is unlikely because there is already a price premium for electric vehicles, largely because of

the other advantages of running on electric has, there are no fumes, less noise, the cost to maintain these vehicles is lower than the gasoline powered vehicles, and for those more sophisticated commercial purchasers that look at total lifecycle cost, they also have lower operation costs. So, this standard is meant to lower the lifecycle cost of products to the end user so even more sophisticated purchasers would see a net reduction in total cost of operation, the less sophisticated purchasers, like residential users, are already paying a premium for a lot of the benefits associated with electric, and we don't think that the small cost – the relatively small costs that we're suggesting for the Title 20 standards, would significantly impact that decision.

Another concern that was raised, now moving to the large charger standards proposal, the Tier 2 requires a 89 percent power conversion efficiency for the largest chargers. Our research from the test data that we've collected, which was collected at Southern California Edison's lab, as well as Pacific Gas and Electric's lab, indicates that high frequency or switch mode chargers can already meet the standard. For purchasers of these products that are concerned with durability, there is an alternate technology available called hybrid, it's a hybrid of the best most efficient elements of ferroresonant and the most

efficient elements of Silicon Controlled Rectifier, or SCR technology. And in our tests, we identified one hybrid charger that was very close to meeting the 89 percent power conversion standard, it was 88.3, so we believe small changes to primarily the materials associated with this charger could move it into the range of compliance and, again, this is a Tier 2 level, so there would be more sufficient time to accommodate those design changes, including better core steel and thicker copper conductors in various parts of the charger.

We've had a lot of questions today on power factor, I wanted to take an opportunity to provide a little bit more information on power factor, and why the power factor levels were chosen, where they were chosen. This research I just want to site is based on what is now EPRI's lab in Knoxville, Tennessee, they prepared a report to assess the impacts of power factor correction on commercial building line losses, they developed a model and tested the model in the laboratory, and the findings from this report indicate that correcting power factor, it can be a cost-effective strategy to reducing overall energy use by reducing losses in building wiring. For battery chargers, and Ken alluded to this earlier, active power factor correction is only cost-effective to the higher current products, but the specific standard that we're proposing actually has two

elements. So, for lower power products, approximately between 10 watts and 60 watts input power, we proposed a .55 power factor standard. For illustration, we provided basically the two primary products that would fall within this realm of standard, it's a low power laptop, as well as a residential power tool. The cost associated with reducing – I should say increasing power fact for the residential power tool can be achieved by optimizing the capacitance in the circuit to improve power factor. This has a very small incremental cost, this is possible for products that are dedicated battery chargers and do not provide any other function, other than battery charging, like the residential power tool. Battery chargers that are also power supplies, silicon solutions are required to meet the .55 watts, and so the low power laptop here you can see is a higher incremental cost. Battery chargers that are able to use linear rectification solutions already meet the standard, and I just want to note that the payback periods reflected here do represent a 2X or two times markup on the incremental cost. For higher power products, we've recommended a .9 power factor requirement, this generally means active power factor correction would need to be applied, and it is cost-effective, here are four examples of applications within the small standard, with an incremental BOM cost we've estimated at 90 cents, we've marked that up

at 2X, these are independent of the cost and saving associated with improving the efficiencies of the products, so the other metrics that we discussed earlier, and the payback periods are all within the lifetime of the product. The methodology that we used to calculate these BOM cost was to survey the silicon solutions that were available for active power factor correction, as well as interview experts within the industry to give us estimates on what they thought the BOM cost would be; here are some examples of industry components that we surveyed as part of this research, but this is only a small sample of the products that are available to help with power factor correction.

In summary, the IOU statewide team encourages the California Energy Commission to move forward with Title 20 standards that we've proposed in the case report. For small chargers, the high volume, high tech products that have really made efficiency charging solutions inexpensive and widely available, these efficient charging solutions can be applied to what have historically been very price sensitive products. Our research demonstrates that it is technically feasible to improve these products to an average of about 70 percent efficiency. This standard is far below that technical feasible level and our research suggests it's a good compromise between incremental cost and energy savings at 40 percent average active mode efficiency.

Approximately two-thirds of the energy use can be saved, so this is an important place where we're losing an opportunity if we don't move forward, and the proposed standard is based on a three-part metric of improving each operation mode, as well as a power factor requirement. For large chargers, this is a more mature market, the metrics are a little bit more complicated because these products are already more efficient. We have power conversion efficiency, charge return factor, and then limits for maintenance in no battery mode power, in addition to power factor requirements. This is a more -- incremental improvements are a little bit smaller in this market because energy efficiency has already been a focus, so we have about 10 percent energy savings opportunity against the current usage. And the added costs are significantly higher on the order of hundreds of dollars, but the payback period for these products is quite short relative to their lifetime.

In summary, we have a big opportunity in front of us to, in total, when you combined the small and the large battery charger system standard to save 35 percent of current energy usage; it's equivalent to nearly one power plant, and that is with entire stock turnover. The per product incremental cost, if you want to treat it just at a high level with an average, which I'm not implying this applies to every product, but it is useful to think about

the total cost per product and the total savings per product, the total incremental cost is on average $1.80 per product, savings is around $14.00, which is a benefit of a cost ratio of more than 7:1. That's an average, some are a little higher, and some are a little lower. The net present value of consumer savings from the first year of sales where we take into account the total lifetime associated with those sales, is $300 million, which is orders of magnitude greater than the cost of regulation. So, we have an opportunity in front of us in this first year to get energy savings in California to help meet the energy needs and policy direction of the state. And our technical research we've covered for the IOU Statewide Team supports that conclusion and direction. Thank you.

MR. LEAON: Okay, I want to thank the Ecos team for their presentation. I do have several blue cards here and let's go ahead and get started with some questions. And first up, I believe it's Dan – Dan Jakl.

MR. JAKL: Once again, I'm Dan Jakl representing Motorola Solutions, Inc. I believe I submitted a couple blue cards, but I think one goes back, actually, a little bit to the first presentation that Ken was doing. We were looking at external power supplies as being regulated, and I believe there was a note made that said they were actually exempted for battery chargers. I believe, Ken, you made a

quick comment that many are exempted, so it may actually be a few, but just a comment on that. So, I was just curious to see how the CEC was maybe going to handle that as far as power supplies for battery chargers, external power supplies, would be regulated under the Power Supply Regulation, or the DOE's, as well as the battery charging system.

MR. RIDER: Yeah, the way that it's proposed right now and is consistent with the way the DOE is approaching it is that, whether they were regulated in the past or not, that they're incorporated through the test procedure, and that's part of the strategy, that's why that strategy applies that was just presented in the Ecos report of using a Level V, so it would be included whether they were regulated in the past or not because of the design of the test procedure.

MR. JAKL: Okay. And all I can ask is if you would review the response. I think it was in the staff report, number 2 in Appendix C, and it talked about they are not included.

MR. RIDER: Okay, well, there were some that were not included and maybe it's not clearly written, I'm sorry.

MR. JAKL: All right, continuing on, I just want to mention for our products, Motorola Solutions, for our products, Motorola Solutions, I guess you could say for two-

way radio professional use products, as well as bar code scanners and such, we're still a market leader. And right now we have several comments, probably not enough time to go through all of them today. I would prefer, actually, probably to be able to meet again at some point with another workshop, if possible. But I do want to mention, I think Teresa mentioned, we do use the control switch, whether it's a comparator or a microcontroller, to be able to control the current on all of our products. And, to our knowledge, other than maybe a few consumer products that we have, none of ours meet the proposed standard today as far as power factor, or three-tenths of a watt, and no battery mode, things of that nature, so I just want to throw that out there. And I do believe in the case study, they were showing that two-way radio chargers – I think they were showing that about 50 percent of them are compliant today, obviously apparently that's none of our products. So, I don't know if that number is really accurate as far as what's maybe sold in California, so I just wanted to mention that. I don't know if you have any comment on that, or how many were even tested as far as two-way radios, or if they were consumer-based products.

MS. FOSTER-PORTER: We did not test a large number of two-way radios to determine that compliance level, so I think it was our best estimate based on the data that we had

available.

MR. JAKL: Okay, and another comment I have, and it looks like a lot of work has been done since the last report that we saw, and I think even Ken mentioned, as far as looking at the maintenance mode, Nickel batteries, I think we saw – I think the number you used was about three percent loss, I would say somewhere around actually five percent is probably an average. And I think, Suzanne, I think you were just showing something around the 15 percent or 10 percent stan loss over 24 hours for a Nickel-based battery.

MS. FOSTER-PORTER: That's right. Ten percent – we tried to use generous assumptions to ensure that the self-discharge was appropriately counteracted, and so we used 10 percent for NiCad and 15 percent for Nickel Metal Hydride, which I think is kind of on the – we were trying to be generous in that modeling assumption.

MR. JAKL: Okay, and I appreciate that you're looking at that because I do believe -- we're mixed chemistry charges on all of our products, a lot of professional public safety, mission critical customers still want Nickel Cadmium, Nickel Metal Hydride, for their needs, to suit their temperature performance needs, maybe their cycle life needs. So, it's still very important to us. The only problem is, of course, the standard Nickel is not as efficient as lithium, and so for a company making a lithium

ion only product, they have a little less work to do. For a company that also has Nickel batteries in the test procedure, of course, you would have to test Nickel and Lithium because we run multiple cycles, whether it's one battery in one pocket, or one port, or a battery as you showed in your picture, six ports are full, and you run the test multiple times. Nickel still has the disadvantage as far as to meet the regulation that's being proposed. I think, in the active mode, it's 1.6. We might lose somewhere in the 10-20 percent for a Nickel battery. So, I don't know if they would be willing to look at maybe moving that up to 1.8, maybe, if it's a Nickel battery, just for the active mode, whether it's doing a Delta T-type termination, or minus Delta V-type termination, which I think you had shown, as well, in your presentation.

MS. FOSTER-PORTER: The approach that we've taken is to be technology neutral on batteries, and part of that is to ensure the longevity of the standard as technologies transition over time. I mean, I would encourage you to submit your specific rationale for evaluation by the Commission.

MR. JAKL: Okay, thank you.

MR. LEAON: Thank you, Dan. The next blue card is from Alan Mears, also with Motorola.

MR. MEARS: Thank you. I'd like to address the

issue of power factor correction. The Ecos report says that active power factor correction is only cost-effective for higher power battery chargers, is that correct? We've done some analysis and, for lower power supply battery chargers, we did some modeling and we find it's impossible to get above .59 power factor correction. I notice the staff report requires .6, although Ecos mentioned .55. Do they plan to change that back to .55?

MR. RIDER: In the presentation I gave today, I mentioned .55 is our proposal.

MR. MEARS: Okay, that's different from the staff report.

MR. RIDER: Right, and this presentation has a few areas that are different from the staff report.

MR. MEARS: Okay, the other issue with the power factor correction is that the .59 is only obtainable at a single load factor with the capacitor. You need the more sophisticated, less cost-effective mode if you want to get it to be that high power factor correction at different load values. And, of course, battery chargers, the load on the power supply varies according to how far you charged, so it really is not possible to maintain that power factor over the entire charge cycle. Also, for multi-slot chargers, you may have one to four, six, or even more batteries in the charger, so the load is going to vary greatly. It's

impossible to maintain power factor correction over that range.

MS. FOSTER-PORTER: Yeah, I would encourage you to submit that comment and we could take it to our technical team to consider. I don't have a specific response.

MR. MEARS: Okay. Another issue is with regards to electromagnetic community impacts of some of the changes suggested, such as moving from a Level IV to a Level V power supply. You did discuss issues like getting the UL approval, but changing a power supply will require FCC evaluation. Also, if your original supply is a linear supply, that has much less EMC issues when you go to a switcher, much higher EMC issues. That was brought up in the staff report, but it was dismissed rather abruptly, it is not a concern. So we'd like to see that addressed better.

MS. FOSTER-PORTER: Yeah, I can't speak to the staff report. I do know that a lot of the off-the-shelf external power supplies already to pre-certification, you know, for UL and for FCC, so depending on what solution you're looking at, you may not be required – or, you know, that might be done by a supplier, rather than by –

MR. MEARS: Actually, the combination must be tested, it's not sufficient to have a power supply that complies, the whole battery charger system must be tested.

So that's not sufficient, even if you buy a power supply that complies, your end system must be tested.

MR. RIDER: We responded to that, like you said, rather briefly in the staff report, and I think the concept here is that we're not telling you to go – that's not your only compliance about this, is to use the switch mode power supply; or, maybe it's your evaluation that it is, but it's not how we're approaching the standard in the staff report in our analysis. So, the reason we don't just tell industry, "Use the switch mode power supply," I mean, that would be really easy, we could just write that, right? But it's because of the complex issues that you guys are familiar with, that you can choose the compliance path that is appropriate, and if you have EMC issues, there probably is an appropriate compliance path for you, unless you're telling me that you can't be efficient and meet EMC at the same time.

MR. MEARS: It's difficult and it seems like a lot of your evaluation for cost-effectiveness relies on these rather simple approaches, and let me point out that they're often not possible. You simply state, well, you can use another method.

MR. RIDER: Well, you were just telling me, you were standing in front of me telling me that it's not possible, but we would need – this is one of the reasons we did that

Request for Information because it's just – you're telling me it's not possible, but we need the technical details, and it sounds like you've done a lot of that analysis, it sounds like you did analysis on power factor, and also of the grid analysis, and we would like to see it, and then we'll use that as justification to alter the Standards.

MR. MEARS: Okay, well, Motorola did actually come – Motorola Solutions came in January and put a presentation together for the staff for the afternoon, but none of the information we presented appeared in the staff report.

MR. RIDER: I have not seen that information, so I'm sorry.

MR. LEAON: Well, as I recall, there was not – I was at that meeting – a lot of issues were raised, but I don't think we got into the technical issues that we're discussing today at that particular meeting, though these issues were surfaced through it.

MR. MEARS: Okay, well, in conclusion, I'd like to thank you for the opportunity to talk. I think it's pretty clear that a lot of Manufacturers would like more opportunity to discuss this. I was wondering if you'd like to consider the possibility of another workshop as soon as possible, with more time given to Manufacturers to present their positions.

MR. LEAON: Well, we'll look at that and see if we

can accommodate that through the schedule that we've developed, but certainly, at a minimum, you know, feel free to talk directly to staff, we are happy to set up conference calls, we might be able to set up another WebEx, so we'll look at various approaches, I think. But I think the feedback that we're getting today is very valuable and I would definitely like to continue the dialogue and make sure that we understand the issues that you have, and that we also get the information that we need in order to evaluate those concerns. So, again, one-on-one meetings, phone calls, conference calls, and we will look at the schedule to see if it's feasible for us to include another workshop. Definitely, if we move to the formal rulemaking phase, we're required to have another public hearing through that process, so there will definitely be that, but we'll also look at what else we can do.

MR. MEARS: Okay, thank you.

MR. LEAON: Okay, Ric, so you don't miss your plane. No more? Okay, thank you. Okay, Stan Rodriguez, Makita.

MR. RODRIGUEZ: Yeah, I'd like to [inaudible] [01:22:32].

MR. LEAON: Absolutely, okay.

MR. ALBERT: Again, thank you for the opportunity to discuss this issue with you all. Nice meeting you, Phil, I mean, it's good to have another double EE around, right? A

couple questions regarding the Ecos report. One question was with respect to the self-discharge estimates that you'd come up with, and you considered the amount of energy required to maintain the battery. Did that include the charge acceptance ratios of the cells, Nickel-based cells at those points? Or, was that just the loss of energy of the cells?

MS. FOSTER-PORTER: We included the internal -- maybe I should ask for clarification because we included the losses associated with the internal resistance of the battery.

MR. ALBERT: But be aware that Nickel Metal Hydride, Nickel Cadmium cells have in them a secondary reaction that provides for the cell safety in the case of overcharge. And so, when maintenance is occurring during that time that you're returning that lost capacity to the cell, you're doing it at the point where the cells' charge acceptance is at its lowest point, and I think that was reflected maybe in Ken's analysis where you looked at –- I think it was 60 percent charge acceptance at max state of charge?

MR. RIDER: Right.

MR. ALBERT: Right. So, in your calculations, I didn't see that factored in there, so I wondered whether that was there or not.

MS. FOSTER-PORTER: The model that we built was

based on the average efficiency, or, excuse me, the efficiency that would be required by the standard in terms of the charge efficiency. It included the internal resistance of the battery. The –

MR. ALBERT: It appears it does not include a charge acceptance as part of your analysis. If you look at .35 watts, I believe, right? If I remember the slide correctly?

MS. FOSTER-PORTER: Right, and then what I'd like to point out is that the prototypes that we built around those, you know, to validate the model, did meet the standard.

MR. ALBERT: Okay, but I think you were trying to justify at that point that you provided sufficient power to be able to handle, in the worse case analysis, right, the self-discharge rate, and it appears like you did not include for nickel-based chemistries the charge acceptance.

MS. FOSTER-PORTER: Well, my question to you would be what is the effect of the charge acceptance –

MR. ALBERT: As far as more power to keep that cell charged, those cells charged, right? And I think that was reflected in Ken's analysis, right, where he factored in the 60 percent charge acceptance, right, so you may want to go back and revisit those figures, right –

MS. FOSTER-PORTER: Okay.

MR. ALBERT: -- and see whether your assumptions are correct. And a couple of other specific questions. It was

nice to see that you actually built some models up. With respect to the trimmer example, your benefit ratio there, I had some questions about. Would it be possible to review that slide?

MS. FOSTER-PORTER: Of course. And, Ken, would you mind helping me ensure that the slide is properly displayed?

MR. ALBERT: Okay, so I think in the previous slide you had the initial no battery power, was it .31? That was the only non-compliance, right?

MS. FOSTER-PORTER: That's correct.

MR. ALBERT: So, in incurring this $.15 upper, right, the consumer saw 10 milliwatts of power savings. Is that correct?

MS. FOSTER-PORTER: No. So, you can see there are a couple changes associated with that change, .31 watts is lowered, but, in addition, so is the battery maintenance level and the 24-hour efficiency is raised from 13.2 in the case of the Level IV power supply as shipped, up to 18.4 percent in the case of the Level V power supply.

MR. ALBERT: Yeah, I think I see that. I think the real question in my mind is that the benefit of the compliance of the standard, however, is only 10 milliwatts, and the cost was $.15, so I'm trying to understand how you came up with a cost benefit ratio with respect to regulation of one to two.

MS. FOSTER-PORTER: The savings associated with replacing that Level V power supply is manifested in more than just reducing the no battery mode, and so to –

MR. ALBERT: That may be true –

MS. FOSTER-PORTER: -- please allow me to finish. So, in order to calculate the benefit to cost ratio, we estimated the total savings associated with those improvements and compared it to the total cost. I acknowledge that this particular improvement goes far beyond what's required by the standard, which demonstrates, I think, that the level that we've proposed for these low capacity products is actually below the cost-effective level. There's a little room to move up, we're not trying to push this product into, you know, higher and higher level efficiencies, but have tried to really balance the cost. In reality, it's probably a fraction of a cent to procure an external power supply that would have less than – would have a lower no battery power that is .3 watts and the savings, although it's small, it's cost-effective. The reason why we did the evaluation this way is because EPSs are available as an off-the-shelf product and can be replaced. So, we get all the benefits and all the costs associated with that change.

MR. ALBERT: Thanks for explaining your method. Could we also look at the power tool case?

MS. FOSTER-PORTER: Yes.

MR. ALBERT: The one where the PCB is shown, I believe.

MS. FOSTER-PORTER: The final slide here?

MR. ALBERT: No, there's one that has a picture of the revised printed circuit board for the charger.

MS. FOSTER-PORTER: Oh, I'm sorry, here?

MR. ALBERT: Yes. So, just looking at this, so maybe you can explain, it looks like there's a change, there's no LED on the new PCB and there was one on the old PCB?

MR. WALTERS: I didn't address that in the schematic. The LED on the product as shipped does basically indicate when you've got a battery in and in consuming power. If I go back to the schematic, the transistor there -- or between the control IC and the transistor where we've got the base drive there, we could conceivably work the LED in there, and regain that. Actually, when I was doing the testing, I was still running the LED as part of the external power supply, and so I had it on, but we could recover that functionality by having the control IC control the LED, as well, to show that the charge is on, and then it would also have the additional functionality, the LED would extinguish when it went to maintenance mode.

MR. ALBERT: Okay, and then you said you went from –

those are surface mount components on the new PCB? Is that a double-sided PCB?

MR. WALTERS: Actually, that's an example of a similar set of components, it is a single-sided – there are no components on the other side. And those are at roughly the same scale, the surface mount picture may be a little bit larger scale, so –

MR. ALBERT: So that was a reflow process that you used for PCB?

MR. WALTERS: Yeah, that's basically hot air reflow surface mount.

MR. ALBERT: The cost is a little bit higher, right?

MR. WALTERS: Yeah, a little bit. The incremental that – basically, the BOM cost that we came up with on incremental cost, I would say, probably about, if I remember right, about 40 percent, 40 or 50 percent of that is the circuit board.

MR. ALBERT: Let's say a BOM cost includes the manufacturing cost, as well? Is that –

MR. WALTERS: No, that was just the board, the surface mount board itself.

MR. ALBERT: And you went from a CEM1 to FR4 material, is that what you did?

MR. WALTERS: That basically was, yeah, that would have been FR4 on the surface mount.

MR. ALBERT: That was a CEM1P4, right?

MR. WALTERS: The original board?

MR. ALBERT: Yeah, the –

MR. WALTERS: Yeah, I believe so.

MR. ALBERT: So, did you take that into the BOM cost, to move from CEM1 to FR4?

MR. WALTERS: Actually, I was just really looking at what it would cost on about a one square inch of the FR4 surface mount, single-sided, without – I didn't even figure a credit for the original board material because of the difference in cost there.

MR. ALBERT: And you used minus delta V as your methodology? Is that what that is? Or –

MR. WALTERS: In the prototype that we did, that was strictly a comparator to stage voltage comparison, and then dropped down to a maintenance mode, and we kept it at a trickle charge because of wanting to keep it simple, but reliable to where we didn't completely cut off the charge, but we did provide a maintenance charge, so it's basically more – you would call it a voltage comparator control two-stage charger.

MR. ALBERT: But not at minus delta V, it was just a V max?

MR. WALTERS: Yeah, on that. There are minus delta V controllers out there, but we were, in that particular

resolution that we tested, it's V max.

MR. ALBERT: Then, did you evaluate the performance of the drill, the battery pack, before and after the change?

MR. WALTERS: As far as the charge return?

MR. ALBERT: Yeah.

MR. WALTERS: Yeah. And it was basically equivalent.

MR. ALBERT: Okay, thank you. And then, I have some questions on power factor correction. So, I understand the analysis that you did with the cost benefit ratio; that was based upon the model that the EPRI folks had done, right? Is that what you used for the basis for your how to calculate the losses in the distribution system?

MS. FOSTER-PORTER: The model that was used for the case report is described in the appendix to the case report. The methodology that was used to calculate the savings in the EPRI report is slightly different because it's tailored to computer internal power supplies, and the model that we built for battery chargers is tailored to the battery charger. So, it's not identical, but I wanted to reference that that's the platform on which that model was developed.

MR. ALBERT: Okay, so you used that one with – I think it was .50 of source resistance, right? In the –

MS. FOSTER-PORTER: I can't speak to the specific details of the model for power factor. If you have

questions about that, I would – you know, maybe we can talk one-on-one, I can connect you with our power factor expert.

MR. ALBERT: Okay, so then, when you calculate the benefit of the power factor improvement, is that assuming that that load is active the whole time, or did you take into account the same sort of usage factors that you used during the efficiency evaluation?

MS. FOSTER-PORTER: The total BOM cost associated with power factor includes two elements, it includes the active power factor correction chip, as well as additional components required to shut off that chip to reduce fixed losses in low power modes where power factor correction is not required, and the fixed losses would exceed the value of using that circuit.

MR. ALBERT: I guess what I meant was, since the high current draw on the battery charge only occurs during brief periods of time, mostly during active mode, when you factored in the benefit of putting in power factor correction, did you consider the fact that that only represents a small portion of the total time that battery charger is going to be drawing those kinds of currents?

MS. FOSTER-PORTER: We did take into account duty cycle for the analysis.

MR. ALBERT: Is that available, that more detailed analysis available for the power factor calculations that

you presented today?

MS. FOSTER-PORTER: What's available today is what is presented in this presentation and the model in the case report. And my understanding is that that's going to go on the Web. In terms of the model and what might be presented as part of the Energy Commission justification, I think that could be directed to Ken in terms of what – I don't want to commit what he's willing to provide.

MR. RIDER: I think it would be useful for you to identify the places in the appendix to the case report where you're not finding the level of detail that you want, and then contact me or, if you have Suzanne's contact, and we'll try to make sure you get the detail that you –

MR. ALBERT: Yeah, I think just a simpler question which is, when you did the calculation of the energy benefit of the power factor correction, right, did you assume the charger was running at that current the entire time? Or did you assume that it was only running at that current during the times when those currents would be present, but probably active mode?

MS. FOSTER-PORTER: We took into account the power differences associated with the various modes.

MR. ALBERT: Did you use the same usage factors that you used for the energy efficiency justifications?

MS. FOSTER-PORTER: Yes.

MR. ALBERT: Okay. And the, lastly, I guess, with respect to energy efficiency justification, or energy efficiency, active power mode conversion provides frequently a loss in overall energy efficiency. Did you account for that, in other words, to maintain the same compliance with respect to the other metrics, did you account for that in your BOM analysis?

MS. FOSTER-PORTER: Yes. So, the place where that's the most sensitive is in the battery maintenance and no battery modes. The active metric that we have developed is – there is enough room to incorporate the fixed loss and still meet the active mode efficiency cost effectively, that's why the BOM cost that we show reflected in this presentation include both the power factor correction circuitry and also parts beyond costs associated with shutting that circuitry down when it's not required in lower power mode, so that you reduce the fixed losses significantly, and it's possible to meet the .5 as well as the .3 levels for battery maintenance and no battery, respectively.

MR. ALBERT: And when you measure your power factor in all these cases, you used what methodology? What source of data did you use?

MS. FOSTER-PORTER: The power factor analysis, although we did a detailed teardown on the efficiency, the

power factor analysis is based on, as I mentioned earlier, review of existing silicon and interviews with component Manufacturers and experts.

MR. ALBERT: I'm sorry, but I must have misstated my question. What I meant was, when you measured the power factor before and after, the test methods you used involved using an AC source with what output impedance.

MS. FOSTER-PORTER: Yeah, I don't know the specification of our AC source. I do know that we have carefully selected it to ensure it can handle both small and large loads, so I – that would be something that we'd have to follow-up with, I can't speak to the output, the impedance of our source, that level of detail here.

MR. ALBERT: And I have one sort of unrelated question to the case report – I'm sorry, to the staff report, because it actually showed up in the case report, we provided a question back with respect to a comment that was made about a capacitor being used in lieu of a transformer, and got a reference in the case report, I guess, to a document that was a primer, I guess, on energy efficient battery chargers, and I've scoured that and not been able to find any reference in there to the case where you could take a capacitor and use it in place of a transformer, and I guess presumably improve the efficiency. Do you recall –

MS. FOSTER-PORTER: I think I know what you're

talking about – do you want to speak to that a little bit? That was a prototype that was developed by one of our staff members and DOE evaluated it and determined it wasn't appropriate for safety reasons. That is not included in the justification and prototype data that you saw here. These are, you know, using the silicon solutions that we presented.

MR. ALBERT: Okay, very good. Thank you very much.

MR. LEAON: Okay, thank you. Next blue card is from Steven Whittaker with Bose Corporation.

MR. WHITTAKER: Thank you. I have the same question, but I would like to direct it at two different groups just to be on the record. Who would speak for the staff of the CEC here?

MR. LEAON: Okay, do you want technical details or policy –

MR. WHITTAKER: Policy, I guess.

MR. LEAON: Okay.

MR. WHITTAKER: Could I see my card because the question is on there?

MR. LEAON: Oh.

MR. WHITTAKER: I'd just like you to state for the record whether it's the official position of the CEC staff that the analyses presented in the staff report are statistically valid and follow proper scientific method for

problem-solving?.

MR. LEAON: Okay, let me hear that question again.

MR. WHITTAKER: Is it the official position of the CEC staff that the analyses presented in the staff report are statistically valid and follow proper scientific method for problem-solving?

MR. LEAON: Okay, well, first of all, keep in mind that this is still a draft staff report and I know staff conducted a very thorough analysis of the data. I'm not sure how the question in regard to a statistical analysis is germane. I am confident that the staff report is based on sound technical analysis.

MR. WHITTAKER: Was that a yes?

MR. LEAON: I'm saying that I am confident that the report is based on sound technical analysis and that –

MR. WHITTAKER: Statistically valid analysis?

MR. LEAON: Well, I think you have to go into more detail on specifically –

MR. WHITTAKER: It's a pretty well understood term, scientific method, statistical analysis.

MR. RIDER: Much of the analysis done in the report is not statistical at all. A lot of it is just raw measurements. We're taking measurements of power consumption and putting it into a model, so I mean, there are very few places where we're talking averages, where

we're talking, you know, any kind of bell curves, or any type of statistical analysis. Most of it is based on –

MR. WHITTAKER: Sampling? Do you think you follow correct sampling procedures, statistically valid sampling procedures?

MR. RIDER: I mean, we've collected data for a wide variety of products. I think we've covered the concepts accurately. But we haven't tried to statistically characterize every battery charger on the market. We've looked at – the staff report addresses a few categories of battery chargers as an example of the way the proposed regulations can cover generally battery chargers.

MR. WHITTAKER: But you could defend the sample size taken across the industry in order to defend the conclusions you're coming to with regard to the regulations you're planning to move forward on?

MR. RIDER: Well, let me say this, that we have looked at all of the data that is available, we've concluded that the data is reasonable. I think we've heard some specific examples today that some of the assumptions were estimations and, if the question is, in regard to those specific samples, whether it was a statistical analysis, the answer to that may be, for that particular process, no; but, in general, we believe that the staff report is based on the best available data. If you have better data, we would like

to see it.

MR. WHITTAKER: That's a good segue to my final question, which is you mentioned earlier, with regard to having another workshop that you would see how it works out with the schedule. Is this schedule publicly available? Is there a deadline? Is there a reason to be rushing this?

MR. RIDER: Yes. As we talked about earlier this morning, DOE is proceeding with its own rulemaking and they are scheduled to adopt it in July. As we realized the benefits to California for the state's Standard, we need to act by June. So, the schedule is being driven by that and it is an aggressive schedule, we acknowledge that. The next phase in this proceeding will be to, I think, finish the discussion on some of the issues that have been raised today, revise the staff report –

MR. WHITTAKER: Issues for which you admit you need substantial additional information and data in order to come to a valid conclusion?

MR. RIDER: Again, I think the conclusions that we've drawn so far are valid conclusions, based on the data that we've looked at. And we are certainly open to looking at additional information. And should that information change our conclusions, you know, then we'll evaluate the standards as necessary. But, again, given that the schedule is being driven by possible preemption, it is an aggressive

schedule, we acknowledge that and we need to look at starting the next phase, which will be the formal rulemaking, we're still in the pre-rulemaking phase right now and we need to initiate that formal rulemaking process probably by the end of March. And that includes a mandatory public hearing during that phase. So, there will definitely be another workshop on this during the formal rulemaking and we'll look at what we can do to most expeditiously get the information that we need from industry, that we've asked for from industry, over the next two to three weeks, and prepare a final staff report. And that staff report will be a part of the record for the formal rulemaking.

MR. WHITTAKER: Thank you.

MR. LEAON: Okay, the last blue card, Rick Habben, with Wahl Clipper.

MR. HABBEN: I'd like to go back, I have a question on one of your slides, Suzanne. It's right before the gentleman took over, it talked about the .3 watt maintenance load that was required, I think.

MS. FOSTER-PORTER: This one here?

MR. HABBEN: Yeah. So just a question I have, it says AC power required to counteract soft discharge in watts, and for the listing, basically they're all – they went from basically .3 to .36 there, actually .29, but I guess what I'm wondering is, if CEC is looked at setting the

maintenance requirement at .5 watts, and generally what I've seen with switch mode power supplies is that they hover right around the .3 watts for no battery load, if that's the case, you would need to add the .35 maintenance thing in addition to the no battery. So, it technically should be, if my number is right, about .65, .66, for maintenance, instead of the .5. Am I looking at that correctly? Or, am I making an incorrect assumption?

MS. FOSTER-PORTER: The scientist that did the model for us on the team is on the line, and I think it would be great if he could answer that question, directly. Ken, is there any way you can unmute Dave Denkenberger?

MR. RIDER: Sure. So, what I'm going to do is I'm going to actually unmute everyone because he's one of these anonymous call-in users –

MS. FOSTER-PORTER: No, he's right there.

MR. RIDER: Well, yeah, but he called in separately. So, I'm going to unmute them, and then, Dave, once I unmute, if you could just start speaking, I could mute everyone else. Okay, so it's unmuted.

MR. DENKENBERGER: So, in order to meet the .5 watts maintenance for these largest observed batteries, you would need a smaller no battery mode, or fixed loss, and there are many products available that do meet that lower no load loss.

MR. HABBEN: Okay, but in general, to not have to go out and buy special power supplies with special requirements, a more realistic maintenance value would be in the .6 range. Is that correct?

MS. FOSTER-PORTER: Yes, so let me speak to your comment about special power supplies and special requirements. One of the successful markets that the CEC has helped to create is a high efficiency external power supply market, where there are a number of off-the-shelf solutions that are available at the Level V, but even more stringent for very low no load values, so although your statement is correct in that this does not take into account those fixed losses associated with no load, I just want to ensure that it's understood that the external power supplies are widely available and at levels less than .3 watts, in a great many more quantities and models than even a few years ago.

MR. HABBEN: Okay. The other issue that I want to bring up is, if you go to the trimmers, as you know and I know, or what everyone else may not know, fortunately the examples you took are actually products that we make, and I guess I would like to speak where you had pulled up the version of the lithium unit and the version of the Nickel Metal Hydride unit. Yes. So, a couple different things, one is, as I had stated earlier, the lithium ion unit that's

pictured there, that we saw, that is a retail market of $40.00, because of the increased circuitry, the increased cost, the controls that we have to have for both not only the – it's on the circuit board in the unit, but also the actual power supply is heavily regulated, as well. The other thing that I want to clarify regarding the UL cost, I actually did the UL approvals on both of those units, and because of the lithium ion and because of the safety concerns with that, when you submit those type of products which are lithium to UL, it's not an alternate construction as UL would maybe give you a break on, and your $2,000 or $3,000 cost would be correct. When you submit a product that has lithium ion circuitry, it's evaluated as a new product. You can call UL up and if you get a different price, please let me know because I want to pay the lower amount, but, you know, that's at $9,400 for a new product approval, not $2,000 to $3,000. So, I wanted to clarify that cost to get that done. The other thing, you had the cost to switch from, I think, a Level IV to a Level V transformer there, and that cost was estimated to be an incremental cost of $.15. Can I ask if that was the raw cost? Or was that cost at retail?

MS. FOSTER-PORTER: Those cost numbers were pulled from the DOE document on external power supplies. They've done the most recent analysis of cost vs. efficiency, and so

the 10 cents reflects the incremental cost associated with the power supply. We then applied the markup that's in the DOE analysis, that would take that up to retail level, and the markup that DOE uses is just under 1.5 in total, you know, they account for all the things, but the aggregate of all the various factors is just under 1.5.

MR. HABBEN: One point five times the cost?

MS. FOSTER-PORTER: Times the cost.

MR. HABBEN: Okay. So, I can tell you, real experience, that the cost to go from a Level IV to Level V is much greater than $.15 at retail, it's many times that, and because of cost sensitive, I can't give the exact numbers, but it's many times that at retail. And as I stated before, you know, with the overheads and the retail markup, you know, you can use an approximately four times your raw cost at retail, and that's kind of a general number that you can use. So, I just wanted to clarify that, that the $.15 incremental is definitely incorrect there. The other issue that I want to bring up is that, regarding these products, it's relatively – it appears relatively simple to bring those into compliance, but we have other products which are cordless products and that means the power supply has to run the product in addition to recharging the battery, and so your current levels are much higher to make that happen, you're trying to run a motor, powering blades

or, you know, other maybe potential shaver attachments, whatever the thing would be, and it gets – for us, that's one of our big concerns is it gets much more complicated to create a cost-effective circuit and make that product so it can still be retailed into the price point and price range it's currently at right now because you're dealing with the higher current levels. So, I was wondering if you had any comment to that particular scenario.

MS. FOSTER-PORTER: The detailed analysis that we have conducted for the purposes of demonstrating cost have been on these two products, so I can't speak specifically about that product. I don't know if you want to say anything or – I mean, my suggestion would be, you know, your specific concerns that you have, to share those with the Energy Commission because I can't address them in detail here without looking at the product.

MR. HABBEN: And then, one last question is, what are the minimum voltage requirements for your control ICs that you're looking at using?

MR. WALTERS: We looked at a number of ICs and I did not get everything that I've looked at into test, although there was one comparator voltage reference combination that I did test, that will operate on a VCC as low as one volt, that's designed for that kind of single cell application. And it was, if I'm remembering correctly, it was 100 nano

amp of supply, typical for the comparator, and it's onboard voltage reference, which was a two-tenths voltage reference. That would be used for VMAX type two-stage control, and it's one of the data sheets, well, the cut sheets that's on the presentation where I show a lot of different comparator data sheets, so you can get more information on that.

MR. HABBEN: Yeah, if you could get me more information on that, I'd appreciate it. Thank you.

MR. LEAON: Okay, that's all the blue cards I had. Ken, why don't we – all right, one more blue card in the room, and then we're going to check – oh, yes, come on up, please, I apologize.

MR. RODRIGUEZ: Yeah, I'm Stan Rodriguez with Makita USA. And a lot of things have been said here by PTI AHAM, a lot of people, I just want to support that completely, and I'm going to try to keep this brief because I know we're way over. But I wanted to just read a little bit of a statement here. The first thing I wanted to look at was the power factor issue, and in the analysis of the report, it indicated that .9 only applied to about two percent of the battery chargers overall. Well, it applies to all of our chargers, so our complete line is affected. An analysis of the power factor requirement can be met with near zero cost is what the report said. Well, we see a real cost associated with the changes; in fact, in some cases,

depending on the size of the charger, it can be up to above $20.00 to the user, so we are concerned about that. The analysis also stated that the savings estimates given here were quite approximately. This leads one to believe that these numbers are not accurate for all cases, and in fact the report suggests further research is recommended. The report also discusses the fact that the calculations used actually use some very simple assumptions for these quantities. We feel the assumptions do not properly reflect battery power and battery power tool chargers used and causes much concern. The report uses a model that assumes our chargers would be charging for three hours a day, because it's looking at three-hour run time, and for some of our chargers, they only run – or they can charge a battery in 15 minutes, so if you looked at that, and you used that model, that would mean that that charger would have to charge 12 batteries a day in this calculation that's being used. In addition, the model uses 365 days, which is another unlikely usage of the charger and battery, so that would give you a grand total, if you run through all that, that this charger in one year would use over 4,380 batteries it would charge because it is a fast charger. So, this model is clearly not applicable to our product line and makes any type of calculated energy savings very suspect. We believe that the actual power factor energy savings for

battery power tool chargers is very minimal, at best only a very small fraction of any of the estimated savings would be realized, making this required change for a cost-effective energy savings means to the customer not very effective. Therefore, the subject should be further studied for power tool type battery chargers before requiring such changes to this category, or it should be removed from the requirement. So, that's our thought on the power factors. The next thing I wanted to look at was the effective dates. It was proposed that these requirements would be published July 2011 and the effective date would be in place July 2012. This would give all Manufacturers one year to bring all their products in line with the requirements. The one-year timeframe is not practical. The time period is not a practical time period to make the necessary changes to a large number of charger products in our line, it's just not. As you can imagine, due to the current economic situation, many companies have kept their staff lean in all departments in order to ride out the economic downturn. We are no exception to this trend and, due to the fact that our development resources are limited, it is not possible for us to be able to make all the changes to the many charger models affected by this proposal within a one-year period. There are design issues, performance testing issues, safety testing issues, parts procurement, applications to NRTL

testing labs, and manufacturing arrangements that just take time in order to produce something. And we can't do that in a year. In light of these concerns, we would request an effective time period of two years be applied to this requirement. Our experience in the past with safety standards where safety issues are addressed, the effective period of two years is used regularly. It is believed that an effective date of two years can be used for safety-related issues; this same time period should be more than suitable for energy saving proposals. And lastly, I'd like to address the charger and replacement parts. The current proposals allow the use of chargers to be used as replacement parts up to five years after the effective date of this proposed requirement. We agree with the intention of this proposal, however, we would like to recommend that this date be pushed out to 10 years for power tool chargers. Our users tend to purchase a number of battery powered tools that run on the same platform, battery charger system. These tools, if cared for, can last a long time. Many times, the collection of tools can run in the thousands of dollars to the consumer and to the contractor, who have made quite an investment that is now worthless if you can't replace a charger. We feel that, after a 10-year period, the impact of not having a replacement charger would be at least minimized. Thank you for hearing my comments.

MR. LEAON: And for the Court Reporter, can you state your name and organization?

MR. RODRIGUEZ: Yes, Stan Rodriguez with Makita USA.

MR. LEAON: Okay, all right, one more blue card in the room and my eyes are getting blurry – Pierre – I don't want to mispronounce it.

MR. DELFORGE: Pierre Delforge at NRDC. Just a question, the savings that this proposed standard will get us to for small chargers was shown as 40 percent vs. a technically feasible 70 percent, so my question is have you – and the question is actually more for Ken for the CEC, have you looked at higher efficiency levels that would still be cost-effective? And could you do that as, you know, next iteration as you take into account the comments from today's meeting?

MR. RIDER: Well, the way the model, the Excel sheet model that we posted on the Internet, you can alter the proposed regulations and it will change – it won't unfortunately – there's no model for cost – the hard part is cost. So, if we got to a more stringent level, developing new cost assumptions are very difficult, and that's actually one of the problems that I had with – I had mentioned with the DOE analysis, is that extrapolating out from what you know, like these teardowns, and the DOE teardowns, is a kind of guess at what the cost is that is difficult to measure.

I think it's well established given that the cost benefit ratios of what we're proposing are three, that there's room to go to more efficient chargers. I think, within the timeframe of one year that we're proposing, that might be – I don't know what the feasibility of that would be. But the model is open and you could see what different assumptions would be and if you have cost assumptions to go with a more stringent level, you could plug those in, but unfortunately I wouldn't know what the cost – I have no idea what the costs would be for more stringent levels.

MR. DELFORGE: Okay, thank you.

MR. LEAON: Okay, why don't we go ahead and check if anyone on the phone has any comments.

MR. RIDER: Okay, well, I like this hand-raising feature, so I'm going to go with the hand-raised people first. I'm going to mute everyone else. So, I'm going to start with Joanna and you are now unmuted.

MS. MAUER: Thank you. This is Joanna Mauer from the Appliance Standards Awareness Project. And, first of all, thank you very much for the opportunity to participate today in this workshop, and I just wanted to briefly comment on the significance of this CEC rulemaking and the context of the DOE rulemaking, and this has been touched on earlier. First of all, the CEC rulemaking has a broader scope than what DOE is addressing, which means that this rulemaking

will achieve long-term savings for California from standards for non-consumer products, which DOE does not have the authority to regulate; second, California has the opportunity with these standards to accrue savings from the standards for the consumer chargers before the DOE standards take effect, and this can help the state meet its aggressive goals for reducing energy consumption and greenhouse gas emissions. Based on the proposed effective date in the staff report, California would accrue at least one year of savings before the DOE standards go into effect. And I'd also note that, while DOE is required by statute to publish a final rule by July 1st, we still haven't seen a proposed rule published by DOE. And DOE has recently missed its legal deadline on new standards for refrigerators, the deadline was December 31st of this past year, and we still haven't seen a final rule published, and other rules also seem to be falling behind at DOE, which raises the question of whether DOE will be able to meet its legal deadline for battery chargers. And because of this, we'd certainly strongly urge the DOE not to abandon its efforts on this rulemaking when the timeline and outcome of the DOE processes are still uncertain. Third, a strong California standard could potentially result in a stronger national standard than what otherwise might be achieved. As has been noted, today during the workshop, the proposed metrics in

the staff report would ensure energy savings in the field, regardless of how a particular product is operated, since they address efficiency and charge maintenance and no battery modes. In contrast, in the preliminary analysis that DOE released last year, DOE proposed an annual energy use metric. And DOE could follow California's lead and establish metrics that would at least more closely resemble California's proposed metrics to better ensure energy savings in the field, and we, along with other organizations, proposed this approach to DOE in comments last fall; of course, we don't know how DOE will respond to these comments since they haven't yet released a proposed rule. And we hope that, if California sets standards that achieve significant cost-effective energy savings using readily available technology, DOE would establish standards that are no less stringent than the California standards. And finally, regardless of the ultimate DOE standards, the initial California standards would likely spur efficiency improvements in the market that could have long term energy saving benefits. Thank you very much.

MR. LEAON: Thank you, Joanna.

MR. RIDER: Okay, I'm going to unmute Katt Fretwell. And you are unmuted.

MS. FRETWELL: Thank you. I'd just like to say that, as a smaller Manufacturer, we have not been privy or

not been following this process, so a lot of the stuff I've heard today has been something that was a surprise to me and I feel like I need to come up to speed before I can give adequate comments, but I did want to say that, as a company that makes industrial very low volume, very long-lived products, the things I see as far as cost estimations have not really been representational of our own experience with respect to upgrading power supplies. I would like to know if there is a way that you can provide detailed costing information to support such a case without it being, you know, publicly available to your competitors. Is there some sort of confidentiality in what you submit? And I'd also like to understand better how the proposed Title 20 no battery efficiency can be looking at 0.3 watts when California hasn't even mandated Level V, and Level V for external power supplies above 50 or 51 watts are allowed to be at 0.3, alone, without adding the complication of adding extra batteries to that. Thank you.

MR. LEON: Yes, Katt, this is Mike Leaon. Yeah, there is a confidentiality process and if you want to contact me directly, offline, we can talk about that. Oh, hang on. All right, I was having a sidebar there. Yes, the data request letter that is posted to the CEC website does include information about the confidentiality request, so I would encourage you to go to our webpage, it's under the

appliances docket, and take a look at that letter and if you have any additional questions, please give me a call. The technical question, I didn't quite follow that last question, is there something that we wanted to respond to there, Ken?

MS. FOSTER-PORTER: This is Suzanne Porter from Ecos Consulting. Katt, the no battery levels are more aggressive than the current mandatory standards for external power supplies, in part because this technology to reduce fixed losses at low loads has become much more widespread and much less costly than it was when the external power supply mandatory standard was adopted. So, the incremental cost associated with reducing those fixed losses has become a lot lower, and there are many components suppliers and external power supply manufacturers that can meet requirements at fairly low cost.

MS. FRETWELL: Okay, thank you for clarifying that, I did just want to mention that, for – there's a significant difference between the models used by very low volume Manufacturers who have to meet worldwide regulations on one external power supply vs. a high volume consumer electronics Manufacturer, and which suppliers you can deal with, and what you have to try and roll into one package, so again, the costs are a lot higher than what I see represented here, I just want to make that point clear, for us, anyway. Thank

you.

MR. RIDER: Okay, I'm going to open up the lines, in general, because there are some people who may not be logged into the WebEx. Well, some music to finish up the workshop. If anyone wants to speak above this while I locate the culprit, go ahead just so – are there any other questions on the line? I'll take that as a no, so I'm going to mute.

MR. LEAON: Okay, any other questions, comments in the room? All right, well, it was a long day, it's almost 4:30. I want to thank you for your patience and endurance today during this workshop. I think it was a highly valuable dialogue, and I encourage everyone to submit written comments by March 15th, and these need to be submitted both electronically and in writing, and look at the notice that's posted to the website for specific direction on how to submit written comments.

Our next step is, well, to continue the dialogue, I think. I think we heard some issues today that we're going to be following up with, and I certainly encourage, if you have questions on policy, or process, call me directly. For technical questions about the staff report, please contact Ken Rider or Harinder Singh, directly, they would be more than happy to talk to you about your questions. We'll also look at what we can do, given our very tight schedule, about either having some one-on-one meetings, or conference calls,

or WebEx, and we'll try and get that done over the next two to three weeks. Our objective is to complete the staff report over that period of time and, again, our aim is to start the formal rulemaking phase by the end of March and, of course, that ultimately is a decision of the Efficiency Committee. We will be reporting back to them. And they will make that call, ultimately. But, should they direct us to go forward, we would notice the proposed permit regulations at the end of the month and there will be another public hearing probably in the late April timeframe. So, again, I thank you for your participation today and your feedback. It looks like we have one question in the room here. Yes, the question was, was Ecos' presentation up online, and it is. And I do want to thank the Ecos team for their presentation today, I think it was very informative, and we appreciate your support, and we appreciate the comments and feedback that we had from industry today. All right, that concludes our workshop. Thank you.

(Adjourned at 4:25 p.m.)